

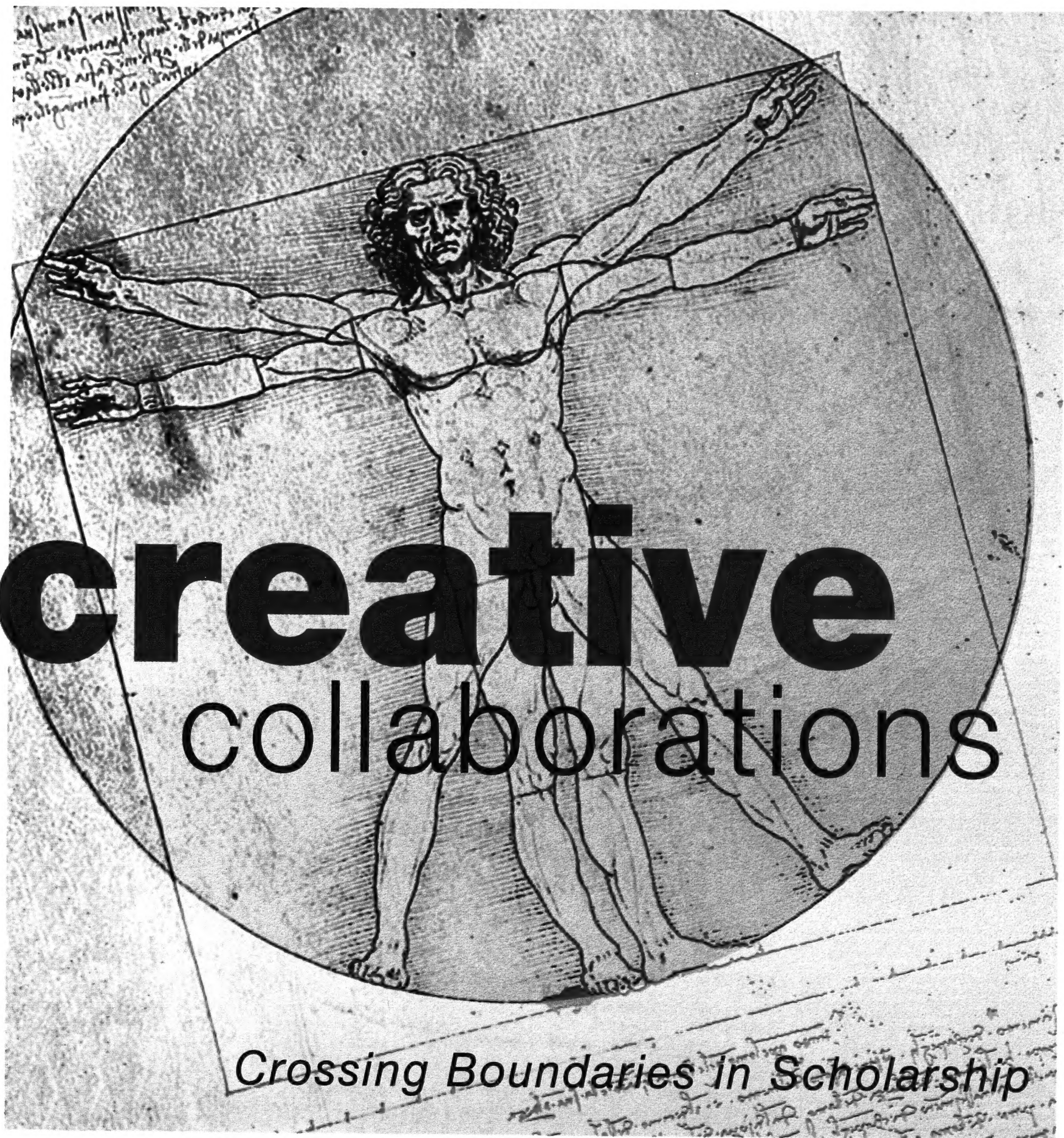
UNIVERSITY OF ALBERTA

# folio

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*Crossing Boundaries in Scholarship*



# Game of chance

Opportunity knocks when research project's publicized

By Richard Cairney

When Guillermina Noel completed her thesis project for her MFA (Design) last fall, her innovative project was profiled in Folio, which generated attention from the media. Noel, a graphic designer, had completed an exhaustive research project aimed at helping aphasics to communicate.

Consulting more than a dozen international experts on aphasia, a condition caused by strokes or other brain injury that diminishes a person's ability to communicate, Noel designed a board game that incorporates colours, letters and other symbols to help aphasics use the limited communications skills they possess.

Some aphasics can speak but are unable to read; others can't figure out a word unless they trace its letters on the palm of their hand. Some patients are trapped

"We applied that insight and creativity to our own situation and it was a neat way to improve what we are doing . . . it is interesting how different disciplines can feed off each other. Two minds are better than one."

— John Toporowski

forever – intellectually intact, but unable to communicate in any way.

Noel designed the game, called *Questions and Answers*, for her father, who suffered a stroke and now has a form of aphasia. The game asks a series of questions, at varying degrees of difficulty, based on people, places and events familiar to the patient – in this case, Noel's own father.

John Toporowski was watching the evening news when a feature on Noel's research played across the screen. Toporowski, a teacher at the Centennial Centre for Mental Health and Brain Injury in Ponoka, south of Edmonton, was

intrigued. He and his colleagues work with aphasics and Toporowski thought Noel's research could be adapted for them.

"I saw it as a potentially really valuable tool we can provide families with. This is a centre of excellence in brain injury and providing those resources for families is a big part of what we strive to do," said Toporowski.

Noel was invited to Ponoka to give a talk on design and aphasia, and some of her expertise was put to work almost immediately.

"She sees aphasia through a designer's perspective, seeing the details on how the person would see different-sized text, the colour of different cards those visual cues we take for granted or didn't even think of," he said. "I sort of thought 'Gee, yeah, that makes sense' and it is something we have changed in our practice as well. We have changed font size and styles in our instructional materials and included some colour coding."

"We applied that insight and creativity to our own situation and it was a neat way to improve what we are doing . . . it is interesting how different disciplines can feed off each other. Two minds are better than one. You get two different ways

of looking at it. We looked at it with an educational hat and she looked at it from a designer's point of view."

Noel is delivering a new prototype of the game, produced at her expense, to the school. The questions in this version use names of the school's teachers and activities. And it includes a new level of questions. One, for example, asks if a Canadian would rather eat donuts, chili beans or a chocolate bar.

"There is no correct answer, because it is really asking them what they prefer. It makes room for the patient with aphasia to answer, because they are Canadians and they can answer it. It is more about the patient than about the impairment and that is very important," said Noel, who's excited about the collaboration.

"I am really happy to work with them. They are very sensitive. They understand what I am trying to do and how to use the game and they know the game is not going to make the person with aphasia speak again but that it is going to facilitate interaction," she added.

The plan is for the school to use the game for one month. Then, Noel will meet with school teachers and staff to evaluate its effectiveness. ■

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## UNIVERSITY OF ALBERTA

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Guillermina Noel shows off playing cards from her board game Questions and Answers. Noel's game is being used to help patients with aphasia use their limited communication skills.

## Hey – you got chocolate in my peanut butter!

By design and coincidence, interdisciplinary work is leading to great discoveries

By Richard Cairney

**F**olio kicks off the New Year with a look at creative collaborations across campus – the kind of interdisciplinary efforts that take a more holistic approach to problems, in the classroom and the research lab.

Many of the University of Alberta teachers and researchers interviewed for this edition never imagined they'd be working so closely with experts from such diverse disciplines. Pat Clements, who suggested this theme issue some months ago, may never have dreamed she'd be part of an initiative as far reaching as the Orlando Project. Did Linda Pilarski, a renowned oncologist, ever imagine she'd be working with an electrical engineer? Conversely, did her research partner, Chris Backhouse, imagine working in oncology? Unlikely.

But when Pilarski and Backhouse sat down for tea to discuss their work, an innovative partnership was forged. In cases such as theirs, the collaborations are quite intentional. Happy coincidences result in big things too.

During a new staff orientation session in the summer of 2005, Dr. Tarek El-Bialy, a dentist and bioengineer, struck up a conversation with electrical engineering professor Dr. Jie Chen. They were later joined by Dr. Ying Tsui, also an electrical engineering professor. Last year they developed a technique to stimulate dental tissue healing and re-grow teeth.

These kinds of partnerships are being encouraged among students as well. And as many proponents of interdisciplinary work agree, you can't leave collaborative

efforts to chance.

A disclaimer is required – we don't claim to have produced a definitive, all-inclusive account of such efforts. The intent, rather, is to celebrate such innovative partnerships and their successes, and to examine the difficulties that accompany them.

This is the third special 'theme' issue of *Folio*. Previous editions have provided in-depth looks at international initiatives (Jan. 20, 2005) and teaching and learning (Sept. 8, 2006). To view these and other *Folio* issues, check out our website at [www.ualberta.ca/folio](http://www.ualberta.ca/folio).

Let us know what you think of this issue by writing me at [richard.cairney@ualberta.ca](mailto:richard.cairney@ualberta.ca). ■



# Cross-disciplinary research with bite

*Tiny ultrasound device helps patients short in the tooth*

By Caitlin Crawshaw

While three researchers cut their teeth on different fields, their collaboration has yielded remarkable results.

Drs. Tarek El-Bialy, Jie Chen and Ying Tsui have collaborated to create a miniature, wireless ultrasound device that stimulates the growth of dental tissue. The device will mean big things for those who've suffered tooth damage, particularly the shortening of tooth roots (progressive root resorption) which can be caused by wearing braces.

Approximately the size of your fingernail, the device is designed to slide over a patient's tooth for approximately 20 minutes a day. Inside the device, a tiny transmitter beams high-frequency ultrasound waves to the tooth, employing low-intensity pulsed ultrasound (LIPUS) technology.

It's a remarkable achievement that grew from El-Bialy's work as a PhD candidate at the University of Illinois. At that time, the dentist was pursuing a doctorate in bioengineering, out of a desire to better understand the mechanics behind the movement of teeth and bone in the body. His research project explored how ultrasound could increase healing after the surgical lengthening of tooth bones in rabbits. One day, however, he accidentally cut the incisors.

But El-Bialy continued the procedure for the next four weeks, applying the ultrasound daily to the damaged tooth and leaving the other incisor alone as a control, and found that the dental tissue was growing back on the damaged incisor. El-Bialy published a paper on his findings, because "it was the first time in history that new dental tissue had been formed that fast."

It was a ground-breaking discovery that El-Bialy soon applied to his clinical practice. He found, however, that patients despised holding up a large ultrasound device to their mouths for 20 minutes per day. He realized the device needed to be smaller, but ultrasound companies were not willing to collaborate with him on miniaturizing the technology.

A new staff orientation in the summer of 2005 offered up a new solution. There, El-Bialy met Chen, an electrical engineering professor with a specialization in circuit design.

"When we met, Tarek told me these problems and I said, 'It is not so difficult for us,'" Chen explained.

Soon the group grew to three with the addition of Ying, a U of A electrical engineer who has managed the challenge of choosing the optimal materials needed to build the device.

Less than a year later, the group had produced a prototype. In fact, in the summer of 2006 they were inundated with media interest in the device. But perhaps it is no wonder. As Chen explains, the potential for the discovery is enormous.

"There are 50-100 million patients worldwide suffering from teeth loss or periodontal disease, so the market is huge," he said.

For that reason, the researchers are working on commercializing the device, and have now filed a U.S. patent. They're also looking into its other applications. The team hopes to develop a flexible version of the device which can be worn by patients with broken bones as a bandage, in order to speed up the growth of bone. Additionally, El-Bialy's lab is applying LIPUS to stem cells.

"We started to test (the prototype) on stem cells and we've found that the ultrasound actually stimulates stem-cell expansion and differentiation," said El-Bialy. "Right now, we're working on tooth-root-fracture healing, and tooth lengthening. If someone is missing part of the tooth, instead of extracting it, we are now hoping to get the remaining part and make it longer, so the patient can maybe get a crown instead of an implant or losing the tooth completely."

**"We think this is an artificial boundary – medical scientist versus engineer. We created this boundary."**

– Dr. Jie Chen

They are also intrigued by patient suggestions that the group apply the device to cosmetic purposes, like growing bone tissue to fill out flatter noses. "A lot of times, patients give us new ideas for future research directions," said Chen.

The team is also developing a sensor which will monitor the strength of the ultrasound frequency to ensure the patient doesn't suffer tissue damage. They also hope this sensor will ultimately send information about the condition of the tooth to the patient's dentist, who can monitor its success remotely.

"This is sort of like in aviation where you have a black box ... we record all the information, and if something is not working, we can help the dentist to diagnose if something's wrong or not," said Chen.

Chen figures the team is benefiting from El-Bialy's expertise, but notes that interdisciplinary team work has been a key element of their success.

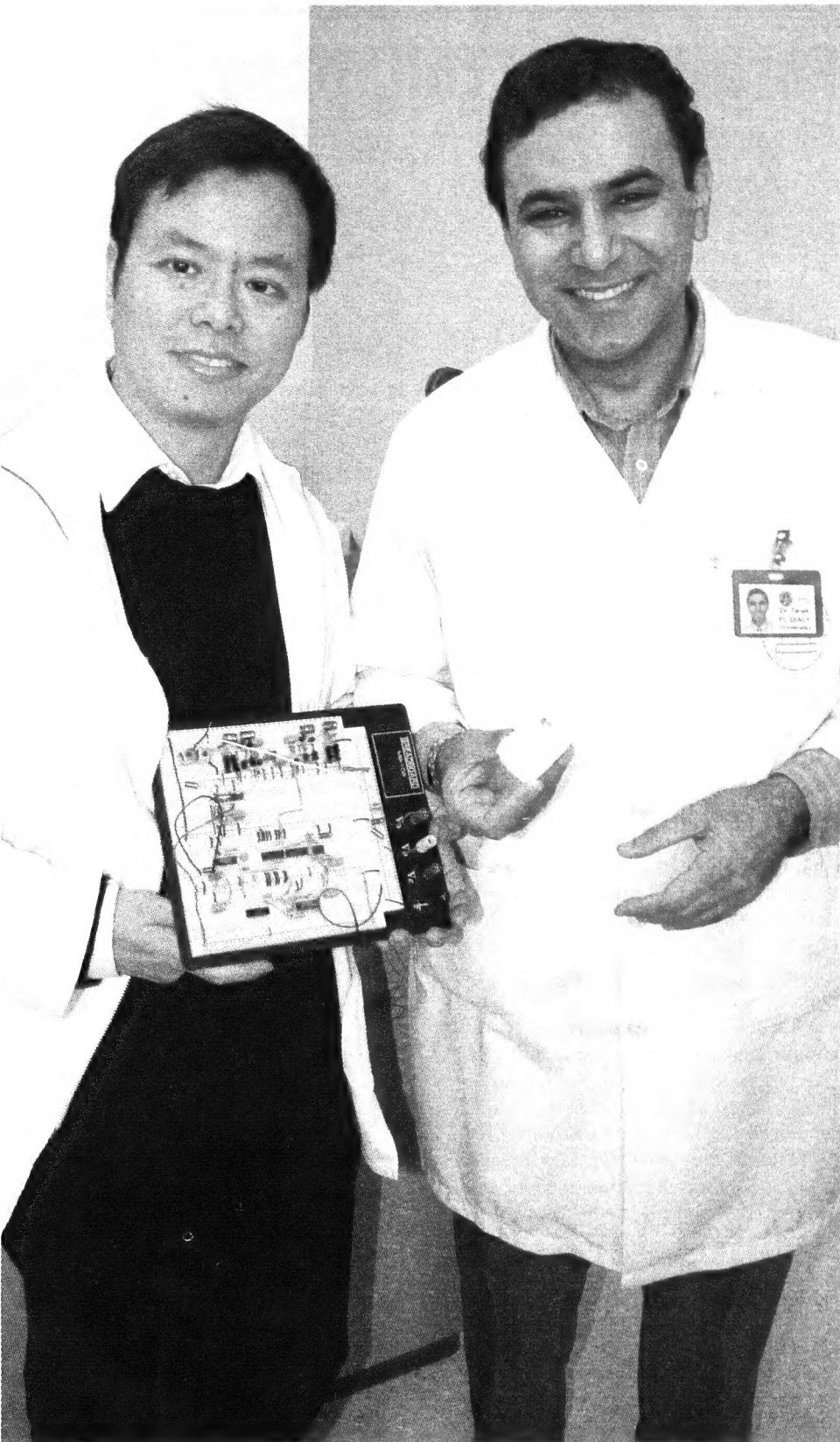
"We think this is an artificial boundary – medical scientist versus engineer. We created this boundary," he said. "Way back a century ago, there was only physics, and no electrical engineering. Electrical engineering is only applied physics."

El-Bialy says it's worked well that both he and Chen are each familiar with the discipline of the other: El-Bialy has a PhD in bioengineering, and Chen has been involved in a number of cross-disciplinary interactions, including work with the Cross Cancer Institute creating 'nanoparticles' that bind to cancerous tumours and fluoresce, helping doctors detect cancer non-invasively.

"Based on my engineering degree, it wasn't difficult for me to speak with Chen, and based on his biology-applied research, we understand each other. We don't have any problems," Tarek said.

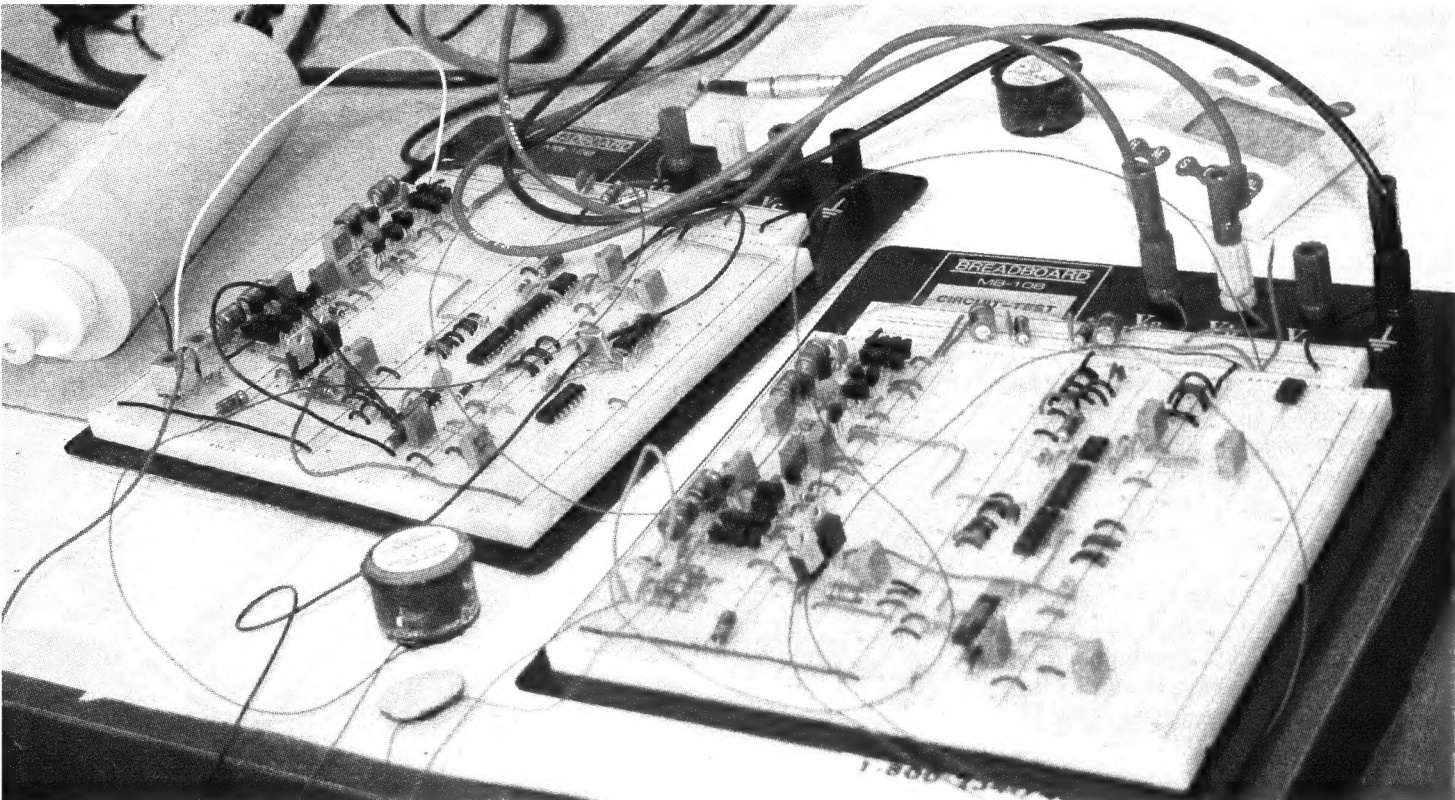
Both believe it's important for students to be trained in an outside discipline and will join forces to teach the ultrasound component of Bioengineering 310. They say it's important for research that students understand the value of interdisciplinary research.

"This boundary has to be torn down. Interdisciplinary science is very fruitful



and rewarding, and we should let the bio people get used to mathematics, and let the engineering student get to study more biology, so both sides can speak the same language. Almost like how I emigrated from China to here...I had to learn to speak English, same with Tarek, so we could communicate." ■

Drs. Jie Chen (left), Tarek El-Bialy and Ying Tsui (not shown) created a miniature device that stimulates the growth of dental tissue with ultrasound technology. Their interdisciplinary work has received international attention.



The prototype of the wireless ultrasound device reveals its complexity.



# Forging the collaboration incubator

*Just what is the best way to nurture radical partnerships across disciplines?*

By Geoff McMaster

If you think about it, research collaboration is a lot like biological evolution.

When diverse organisms in an ecosystem come together, they can produce a new organism better equipped to adapt to its environment. Changes emerge with results wholly unexpected and nearly impossible to predict.

In research, people who collaborate across disciplines often find themselves working on new areas of study they never saw coming at first. From oncologist Linda Pilarski (co-developer of the "lab-on-a-chip") to literary scholar Pat Clements (co-founder of the Orlando Project) to choral music professor Laurier Fagnan (vocal acoustics), the common observation is one of surprise and delight at a shared point of focus that takes on a life of its own.

It's a metaphor President Indira Samarasekera likes to use in describing the importance of interdisciplinary and multi-disciplinary collaboration: "If you look at nature, there's one of the most powerful examples of how diversity and collaboration result in such vastly new and innovative outcomes," she said. "They say diversity is truly the source of creativity. In nature, it's the source of a healthy ecosystem and planet...and resilience comes from that."

But just how does one create the ideal environment for diverse collaborations? Can we assume, as in the evolutionary model, that it will happen on its own, organically and out of necessity to solve problems as they arise? Or does it need to be, as Samarasekera puts it "deliberate, programmed and planned"? It's likely a little of both.

Dr. Nils Petersen, director of the National Research Council's National Institute for Nanotechnology (NINT), says the institute's new U of A facility was designed with collaboration in mind, because multidisciplinary research is one of NINT's *raison d'être*, drawing from science, engineering, medicine, law, pharmacy and business.

To begin with, the centre provides labs, tools and other "common infrastructure that many different people want to use. So you get a spill-over of expertise and interest and opportunity for discussion and so on," said Petersen.

However, as with the new Centennial Centre for Interdisciplinary Science now under construction, the NINT building is also partly an attempt to "take advantage of human nature," to capitalize on our need to socialize. The building's architectural design exploits the principle of proximity, recognizing that creative juices flow in different ways when people ostensibly break from their 'real work' to relax – chatting at the water cooler, gathering for coffee in shared spaces, and exploring ideas that are not programmed.

Petersen says on one level NINT is "a sociological experiment" intended to create a building which allows different disciplines to work side by side. "So we have a chemistry lab next to a biology lab, next to physics lab and so on. Along the same corridor, you will see all the major disciplines represented."

It's a sociological experiment, yes, but one itself supported by solid evidence. Sociologist Rogers Hollingsworth of the University of Wisconsin, who studies the social features at research institutions most successful in producing innovation in the 20th century, says such institutions foster a high level of "cognitive complexity," a concept he loosely aligns with creativity.

"Scientists having high levels of cognitive complexity tend to internalize multiple fields of science, to be boundary crossers, and to have a greater capacity to observe and understand the connectivity among phenomena in multiple fields of science," he writes in a paper entitled *Organizational and Psychological Factors Influencing Creativity in Basic Science*. "They tend to bring ideas from one field of knowledge into another field...and could communicate with scientists in multiple fields."

What's most interesting, however, is that Hollingsworth's concept of cognitive complexity is largely a function of informal interaction and that child-like wonder that Einstein described as the highest level of creative thought.

"Learning new things and moving into new areas is like play," Hollingsworth argued. Those with higher cognitive complexity "tend to be more intuitive and have a high degree of spontaneity in their thinking, to be individuals who enjoy exploring uncertainty and engaging in high-risk research, rather than working in areas

which are already well understood...it is that capacity which greatly increases the potential for making a major discovery."

Being blessed with this cognitive advantage is by no means a guarantee for breakthrough innovation, however. Like any natural gift, the disposition has to be properly nurtured, and in the academy, that only happens with strong leadership, organizational flexibility and a degree of autonomy.

At the top in Hollingsworth's list of the most innovative research institutions of the 20th century is one you might not expect – Rockefeller University in New York – a small centre with all the right traits: "Despite its small size, it still towers over most research organizations in America."

While the University of Alberta cannot perhaps lay claim to the most success in innovation in Canada, it does, nonetheless, possess a healthy and vibrant climate for research collaboration, says former dean of arts Patricia Clements, co-director of the Orlando Project, a huge interdisciplinary initiative that fuses literary history with the power of the Internet.

"They say diversity is truly the source of creativity. In nature, it's the source of a healthy ecosystem and planet. . . and resilience comes from that."

– President Indira Samarasekera

Continued on next page ►



President Indira Samarasekera



Dr. Carl Amrhein



Dr. Linda Pilarski



Dr. Patricia Clements



► Continued from Page 4

"Across all of the faculties across the university there are partnerships of knowledge that wouldn't have existed 10 years ago," she said. "And I think they're beginning to feel quite natural. In the humanities, for example, our project was a radical collaboration between computing science and literary study. But now there are a lot of projects doing that kind of collaboration."

Borrowing another idea from Hollingsworth, Clements also believes we can learn much from two old, venerable universities that have always understood the need for informal communication across disciplines – Oxford and Cambridge. As part of the college system, they have what are called "journal clubs" where professors from varying fields meet to discuss their work. Twenty leading people from a range of disciplines might meet every month, and at every meeting, perhaps three members will assign an article considered essential reading in their respective fields.

The idea is to "get people together whose conversations – which cannot be pressed, and must be easy, exploratory conversations – can produce ideas that will be radical collaborations," said Clements. "I'm sure it would be the best show in town that night. It requires translation, because you're speaking to an audience about your article in your highly specialized field, knowing that your audience does not share that specialization."

According to Pilarski, the oncologist who works with electrical engineer Chris Backhouse on the much-touted "lab-on-a-chip" medical diagnostic tool, translating across boundaries is at once the most difficult and intellectually rewarding challenge of collaboration. Initially, it meant their joint vision failed to communicate to investors.

"One of the challenges that beset us for a long time was that we were hybrids," said Pilarski. "We didn't fit in either community. The engineers saw it as, 'What's all this bio stuff – the Canadian Institutes of Health Research (CIHR) should be funding it. And the biomedical people saw it and thought, 'that's all engineering, there's no hypothesis there – that should be funded by industry.'"

The two researchers spent a few years writing grant proposals, Pilarski says, facing rejection after rejection before they figured out how to spin the project to satisfy committees. The Alberta Cancer Board was one of the first "who showed some faith in us and gave us money for a couple of years, while still complaining that we didn't fit in either camp."

The lesson, she says, is that despite much hype and rhetoric about the need for interdisciplinary and multidisciplinary collaboration to propel Canada into the 21st century global economy, in reality it's not for the faint of heart.

"People have to be very, very committed to what they're doing for this to happen. Casual collaborations can never take off – things like, 'You know, I think we can do something together, why don't we just try something and see if we can get a grant.'"

U of A administrators say they're doing all they can to nurture interdisciplinary research. It's a central part of the Dare to Discover vision and the new Dare to Deliver academic plan, and a number of centres and institutes have been created to cut horizontally across disciplines, as opposed to maintaining specialized vertical silos. U of A Provost and Vice-President (Academic) Carl Amrhein points to the China Institute, the Institute for U.S. Policy

Studies and the Canadian Studies Institute at Campus Saint-Jean as prime examples of horizontal transformation. The newly established School of Energy and Environment will have the same characteristics, he says.

But Pilarski believes the creation of a true collaboration incubator also comes down to that one bottom-line determinant: money. Canada simply needs more funding for research, period, at all levels of government. When the system is stretched for resources, she says, adjudicators are forced to make conservative calls.

"I don't know why the vision isn't there to provide more research. Research is the heart of any country. If there is more money, people will be broad minded...I can see why people are uneasy, because they're concerned about their own fields, and they have a right to be."

But more funding would mean a greater willingness to take risks, says Pilarski, and to invest in a collaborative venture that doesn't promise immediate and obvious financial return.

The Orlando Project is an excellent case in point, says Amrhein. "It's been a pure research project for quite a long time. Along comes a university press (Cambridge) that decides it has economic value, and who knows where it will be 10 or 15 years from now? It may be viewed as one of the great, cutting-edge innovations that can aggregate information and search for complicated ideas."

"One never knows, and universities have to be allowed to invest their precious talent without being held to very short-term concepts of economic payoff."

Clements agrees that resources allowed her team free reign to discover, to see where the project would lead them. "Because we had a major initiative with a lot of money (from Social Sciences and Humanities Research Council, the Canada Foundation for Innovation, and

the University of Guelph), we were able to undertake an experiment. Normally, in the places where money is tighter in the university economy, you do a piece of research which may be highly original, but mostly using the methodology, formats and kinds of publication as last time," she said.

"When we started this, we had no idea what we were getting into. At the beginning we thought we were doing a piece of literary history. We discovered we were trying to solve problems of the representation of literary knowledge online we didn't think existed."

And yet blaming government for lack of funding and vision can only take you so far, argue Amrhein and Clements. The federal research funding bodies are, after all, creatures of the professoriate. They are largely staffed and directed by university researchers. If academics want policy or attitudes to change, they have to start making noise at the ground level.

"Academics to a certain extent run their own institutions, and if we want our research granting councils to take different things into account, then we should cause that to happen," said Clements. "We shouldn't be passively sitting around accepting what is delivered."

Amrhein also urges academics to make their voices heard. "We always move the conclusion that Ottawa's the one that has to change its headspace," he said. "On the other hand, I'm not sure the professoriate has been involved there to the extent that it should...the professoriate has to start making a very strong, concerted effort to have councils think things through in a more horizontal way. Surely we have to be part of the solution, but we also need to think through to what extent we are the problem."

That move towards horizontal organization also means valuing the crucial role students play in many collaborative projects, and properly recognizing collab-

orative research in faculty evaluation. Both tend to be more complicated in the humanities and social sciences, where the notion of individual intellectual achievement has long been a hallmark of intellectual inquiry. How do you decide whose ideas are whose, which are of greater worth or require more brain power or talent?

But as Clements puts it, to stay at the head of the pack, "we need to be really sure the systems we have aren't obstructing paradigm-altering science, but rather enabling it."

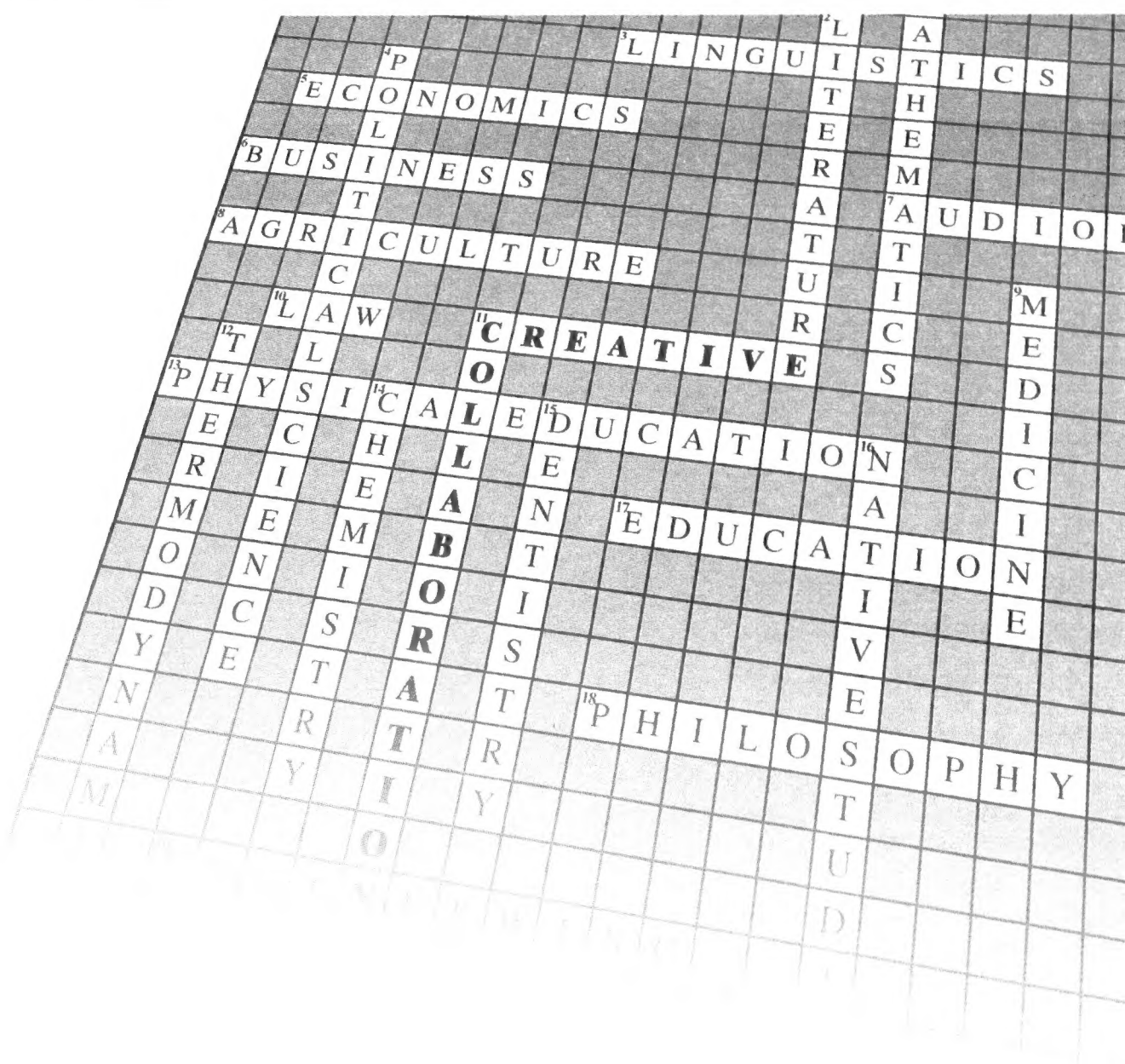
"Ultimately we have a system that is a meritocracy," said Samarasekera. "Professors are evaluated and judged based on what they have accomplished. One of the critical things is being able to give credit for collaborative endeavours without splitting hairs over who did what. Until you create incentives like that, people are reluctant to collaborate."

What does seem clear is that, just as some forms of knowledge become more highly specialized, traditional disciplinary boundaries are fast becoming a thing of the past. They are either coming down or transforming, shifting as soon as they are defined. It's a revolution that forces all of us to think more creatively, and question what we thought we knew.

NINT's Petersen recalls a telling encounter with an artist recently in the university's main social forum for academics, the Faculty Club. "He started talking to me about the importance of nanotechnology for artistic paints. Who even thought, as a scientist, about the kind of problems they face when they want to make a picture more brilliant, or have colours come out more strongly?"

"Now all of a sudden, I'm thinking, 'Hmm, maybe there's something we can do there.'"

Watch out for the audio podcast version of this feature next week on ExpressNews. ■





# Making way for the new

## *New science building's already fostering new collaborations*

By Richard Cairney

Dean of Science Dr. Greg Taylor stands on a viewing deck in the Biological Sciences Building, watching construction crews tearing down the old Physics Building. Built during the 1950s, the building had suffered from an enormous deferred maintenance bill, and was physically unable to accommodate state-of-the-art research labs.

From the rubble will rise the second phase of the new, \$315-million Centennial Centre for Interdisciplinary Science (CCIS). The building will house the Department of Physics, five interdisciplinary science research groups, specialized research infrastructure, lecture halls, teaching laboratories and faculty administration. Scheduled for completion in 2010, it will open the doors to 1,100 more undergraduate students and 478 more graduate students and provide more than 2,800 new lecture and lab seats.

*"When you walk into this building you are going to see science going on all around you. It won't be the traditional cinderblock walls or concrete walls or plaster walls, it will be a lot of glass, so you will be able to look into the teaching labs, the service facilities, the conference rooms – even some of the offices will be quite transparent too."*

– Dr. Greg Taylor

Taylor says the building is designed to encourage interdisciplinary research and learning.

"We really see it as a crossroads to campus in a number of respects. First and foremost, it is a physical crossroads to campus. The major science building will be located right on the quad at the intersection of many pedestrian routes. So students and staff will be moving in and out of it by virtue of its physical location," he said.

"It's also a crossroads to teaching and research. It is a building that will house about 100 academic staff, and the support staff and graduate students that come in proportion to that ... and part of that is bringing together people in ways that they have not been brought together before."

From his vantage point on the Biological Sciences Building, Taylor speaks about what physical properties of a building can or can't create opportunities for students, teachers and researchers to cross traditional boundaries. The Biological Sciences Building itself appears to have been "uniquely designed to prevent collaboration," Taylor said. "It is more of a series of dead-end streets than a centre where people are coming together."

CCIS, in contrast, will feature large atriums and walkways. And research will no longer be conducted behind closed doors. Labs will quite literally have glass walls, enabling passers-by to see what's going on inside.

"When you walk into this building you are going to see science going on all around you. It won't be the traditional cinderblock walls or concrete walls or plaster walls, it will be a lot of glass, so you will be able to look into the teaching labs, the service facilities, the conference rooms – even some of the offices will be quite transparent too," he said.

"So there will be no more of 'I meant to stop in and see you, but the door was closed and I was rushing down the hall.



Dr. Greg Taylor looks on as a construction crew demolishes the old Physics Building. It will be replaced by the \$315-million Centennial Centre for Interdisciplinary Science, making room for 1,100 more undergraduate students, 478 more graduate students and untold interdisciplinary projects.

Now it will be, 'I meant to stop in and see you – and there you are! I'll stop in and see you again.' But it is more than that; it is more than the meeting that should have happened that never happened. I believe that by bringing people across those boundaries you get people to run into each other in a way they haven't before and they get to learn about other people's science, what other people are doing, and that interaction can grow from there."

Phase I of CCIS, which opened last March, is a unique teaching and research setting. In one lab, physics professor Dr. Robert Wolkow's new, one-of-a-kind multi-

probe scan probe microscope. Nearby, Taylor shows off the building's so-called "moose drop" – a crane-equipped loading zone that leads down a shaft to a lab in which autopsies can be conducted on large animals, such as moose.

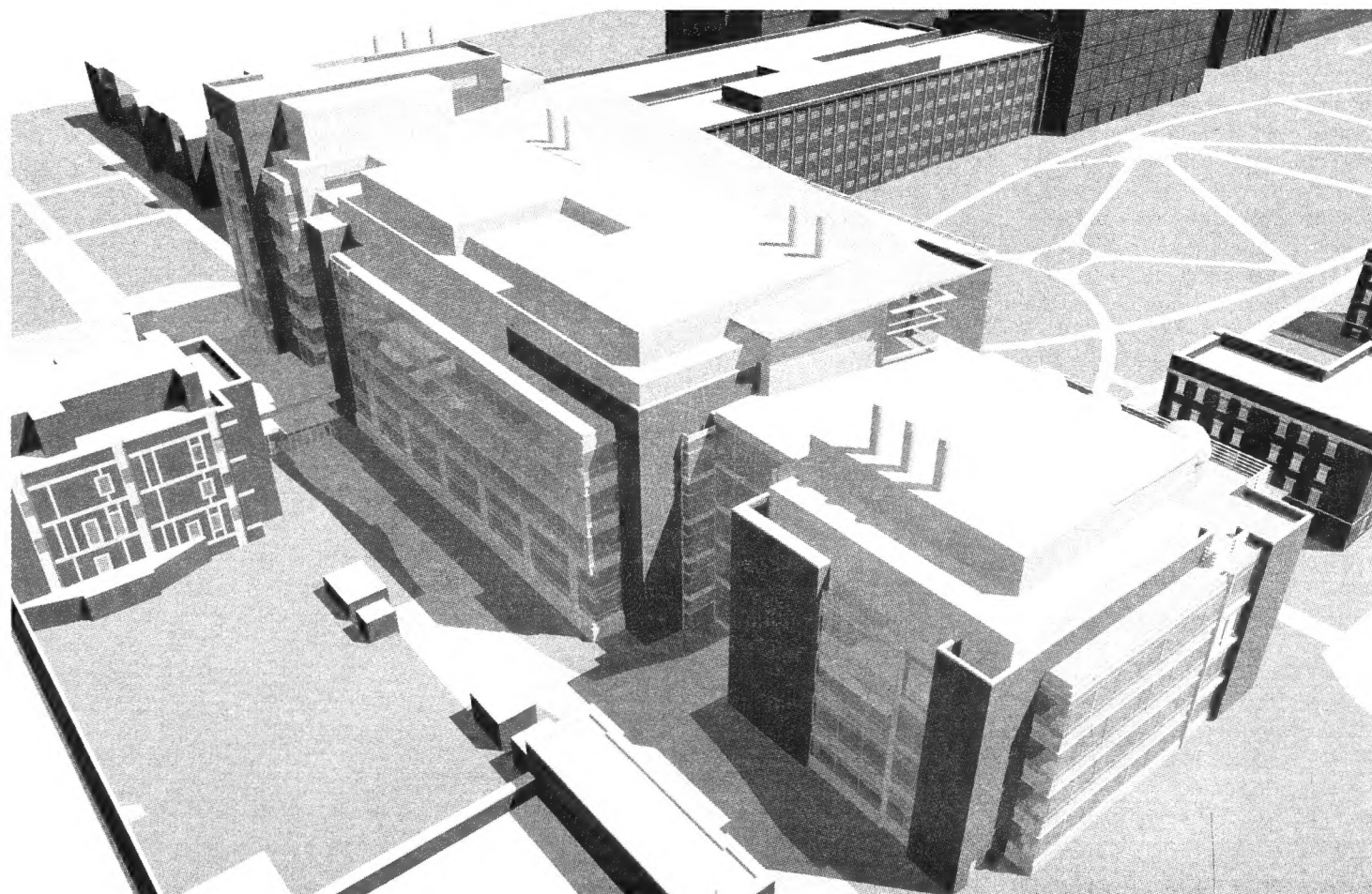
Who knows what relationships the proximity of these two seemingly unrelated labs might produce?

Taylor proudly observes that creative collaborations are already beginning, while the building's future occupants meet to discuss the building's design.

"What has been really interesting to see is the teams that have come together to

design this space, the collaborations that have already started beyond what was there before, simply by virtue of coming together on designing the building now, just by closer contact, by more frequent contact," he said.

"We're bringing them in to discuss what the space looks like and who's going where and how they need to be related to each other and they are talking about other stuff while they are there. So, exactly what we are trying to make happen within the completed building is starting to happen now, just by virtue of bringing them together to talk about the new building." ■



An architect's drawing of the new CCIS building.



# Building a better microscope

Support staff working at the leading edge of research

By Richard Cairney

When you're working on the leading edge of science, it's pretty much impossible to buy the tools you need to conduct research – they simply don't exist. So when Dr. Robert Wolkow envisioned a new scan probe microscope, he relied upon University of Alberta support staff to build it.

Currently undergoing a series of operational tests at Wolkow's Centennial Centre for Interdisciplinary Science lab, the multi-probe scan probe microscope is used to explore properties of different materials at the nano-scale.

"It allows you to direct individual probes to points of interest then have them do nanoscale characterizations," he said.

Some of the device's probes, for example, could provide images of the surface of some material, then touch down on it and pass an electrical current through it, while another probe captures images of that event, allowing researchers to observe electrical characteristics to be read.

"This thing is unusual in that it has several independent scannable probes, and it has a conventional scanning electron microscope watching all those independent scanned probes – so it is a microscope watching several microscopes work," said Wolkow.

"It is all of our design. It is the only machine in the world of its kind," said Wolkow, who holds the iCORE Chair in Nanoscale Information and Communication Technologies in the U of A Department of Physics and heads up the Molecular Scale Devices Group at the National Institute for Nanotechnology (NINT).

Wolkow began working on the microscope two years ago, with the help of U of A machinists and electricians, and engineer Mark Salomons, an alumni of the U of A's engineering physics program who now works as an instrument design engineer with the National Research Council's campus-based NINT facility.

"It's definitely a ground-up kind of machine," said Salomons, who worked with Wolkow to come up with nuts-and-bolts solutions and actually construct the microscope.

But it's built with smaller than average nuts and bolts. And considering most machinists in the province are preoccupied working on heavy equipment or on jobs related to the oilpatch, parts for a scan probe microscope require a special order.

"If the machine shop here is busy with other things sometimes I will call a commercial firm and tell them what I want and they'll just laugh," said Salomons. "We are working with parts that are so small, they just say 'Yeah, right!'"

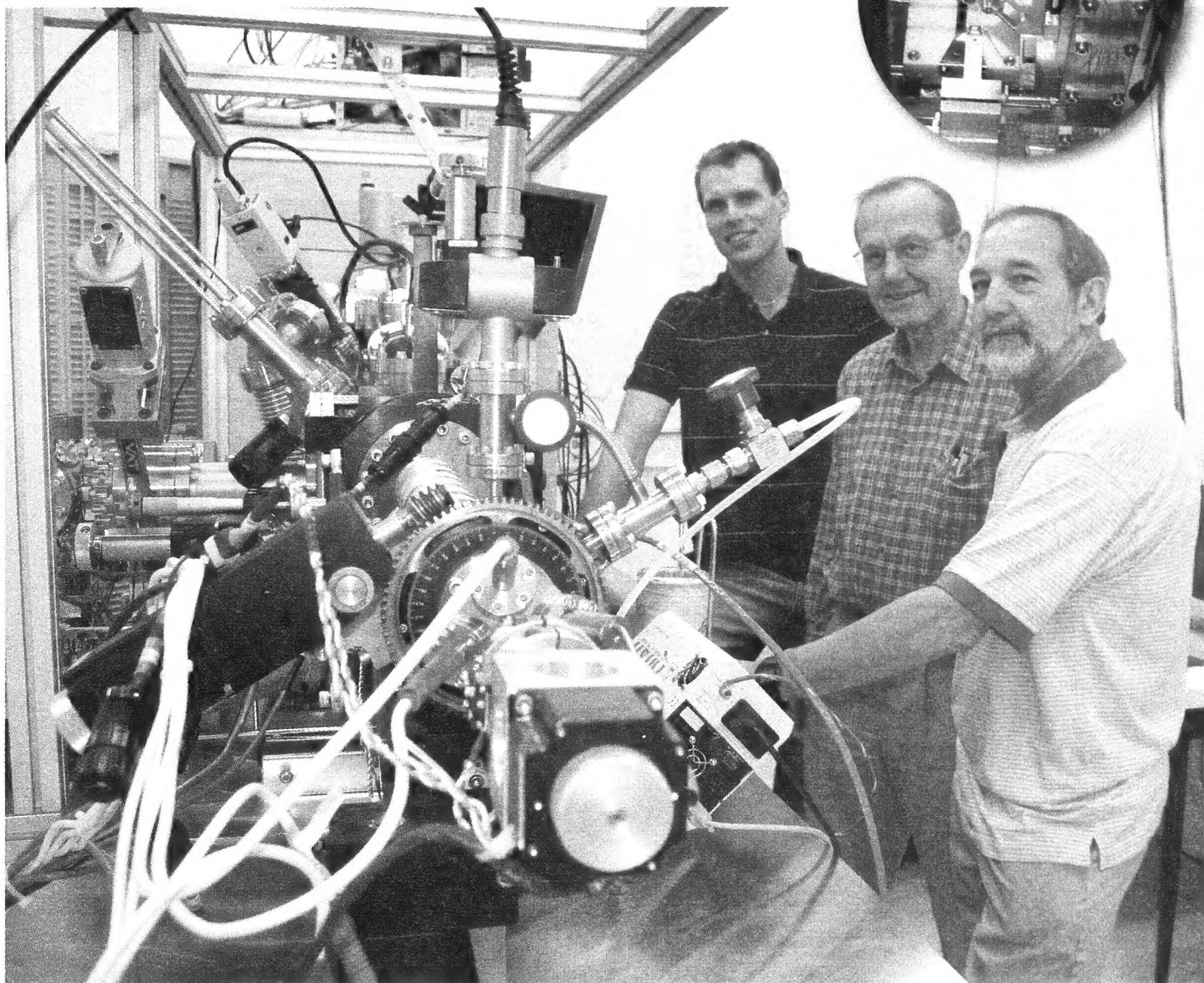
"We are working with half-millimetre screws – it is tiny stuff and often it takes (the U of A machinists) hours to make them because they're made with exotic materials."

The Department of Physics' machine shop is the go-to place for this kind of work, Salomons and Wolkow say.

"They are really good at what they do," said Salomons. "They are used to doing work on research projects, so when you bring them something and say 'We need to do this,' they are able to work with you on it and maybe suggest some changes so they are able to do it – but they won't just reject it."

Senior machinist Gilbert LeChat says every part his shop built for the microscope – and with just a few exceptions, that's the whole thing – was a new challenge.

"Every job is a challenge here because of the size of the parts we have to make. We are doing things that are so small that you can hardly see them. You need to work with a microscope," he said, adding that every member of his staff has been involved in the project. "When you breathe you have to be careful. When you touch a part with your bare hand, you can change its size – the heat from your fingers changes it."



Mark Salomons, Lars Holm and Gilbert LeChat led efforts to design and construct the multi-probe scan probe microscope. The device, used to examine different materials at the nano scale, is the only one of its type in the world. Weighing about 1,600 lbs., the microscope also has very fine parts (inset) including wiring that is not much thicker than a human hair.

"We are always pushing the frontier in electronics. They will buy whatever is available to them on the store shelves, but if it isn't available, they come to us and see if we can build it for them."

– Lars Holm

Campus machinists are highly skilled, says Wolkow. "They often are using their machines and tools at their limits. They are making parts almost smaller than what their own machines are designed to make."

Another person Wolkow consulted with for the project was Lars Holm, a senior electronics supervisor in the Department of Physics who was responsible for creating the electronic controls for the microscope.

"He wanted ultimately to have something that had control over nine of these probes and control each group of three in x, y and z co-ordinates," said Holm. "After we had built one that was successful, he wanted to go to nine."

Holm, who has worked on several jobs for Wolkow, said he and his staff enjoy working on projects as challenging as this.

"We are always pushing the frontier in electronics. They will buy whatever is available to them on the store shelves, but if it isn't available, they come to us and see if we can build it for them," he said.

With the microscope up and running today, a piece of equipment that Wolkow first conceived of some seven years ago is now a reality.

"We could not do what we are doing without those guys," said Wolkow. ■



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Drs. Linda Pilarski and Chris Backhouse are developing 'lab-on-a-chip' technology at the U of A. The diagnostic tool is designed to perform medical tests quickly and inexpensively.

# Bridging a cultural divide with a lab on a chip

*The hard lessons in breaking cross-disciplinary ground*

By Geoff McMaster

Drs. Chris Backhouse and Linda Pilarski are perhaps the best known creative collaborators on campus, partly because their work embodies the promise of nanotechnology. Together, the engineer and oncologist have developed the breakthrough "lab on a chip," a small, portable, diagnostic tool capable of performing otherwise expensive tests on a single cell.

It's the equivalent of "taking my whole lab and putting it on a device the size of a tape recorder," Pilarski said.

The device, which looks like a bunch of tiny channels etched into a glass or polymer slide, is now almost ready for market, says Pilarski. It has the potential to revolutionize health care and save millions in blood tests for cancer and viral infections – and that's just the beginning. The same architecture could also be used for simple, inexpensive tests of our water supply or for monitoring Mad Cow disease. It could even be used in developing countries where access to medical technology is scant at best.

A good idea? Looking back, it seems like a no-brainer. Yet, initially the two researchers had a tough time convincing people to buy in.

"If we hadn't been truly bloody-minded about this, and hadn't realized we were going to do this even if nobody believed in us, we would have abandoned it long ago," said Pilarski.

Their partnership began when Backhouse turned up Pilarski's name in an Internet search about eight years ago. He was looking for researchers working with single cells, and Pilarski just happened to

be looking for genetic predisposition to multiple myeloma in blood cells.

"He found out we did a lot of gene amplification and in really miniaturized quantities...When he saw that, he thought, 'Here's someone who might take working with an engineer really seriously,'" she said.

The two met a number of times over tea in the sun room at the Cross Cancer Institute, growing increasingly excited about the potential in joining forces and what their work could mean for patients.

Their initial challenge was one of translation. They found they just didn't speak the same language. In a world of highly specialized disciplines, a common language can be an obstacle, and sometimes it seemed these two came from different planets.

"We'd often use the same words, but meant totally different things. There's a real learning process in learning to collaborate with someone whose background is completely different from what you do."

Backhouse agrees there is a huge divide between engineers and scientists, one he defines as cultural: "Engineers may spend years in cycles of researching, designing, building, testing and refining complex systems," he said. "Only then do you have something that works so well that it seems very simple. Life scientists expect to go out and buy it, open the box, not read the manual, and still expect it to work!"

Then came another rude awakening: funding. That was one of the hardest lessons of radical collaboration, says Pilarski.

"Although the system makes a lot of noises about how important interdisciplin-

ary research is, in actual fact, it's very difficult to find funding. And when you find it, the amounts are very small," she said.

Several grant proposals were rejected, because funding committees didn't know what to make of this fusion. "One of the challenges that beset us for a long time was that we were hybrids. We didn't fit in either community. The engineers saw it as, 'What's all this bio stuff? Canadian Institutes of Health Research should be funding it. And the biomedical people saw it and thought, 'That's all engineering, there's no hypothesis there – that should be funded by industry,'" said Pilarski.

"We scrambled for money from a number of places and worked on shoestrings, because we were so passionate that this had to happen. If we hadn't had other resources, it would not have happened, which is kind of a sad commentary."

Once Pilarski and Backhouse figured out how to hit the right notes for a range of readers, they hit pay dirt, just as the partnership grew to include, among others, a sociologist in Saskatoon and people in the U of A's Health Law Institute who took up some of the ethical implications of this new technology, such as privacy issues around widespread blood testing.

"I never dreamed that I would find these issues as exciting as I do," said Pilarski. "I think the chip has changed all of us, just thinking about what is possible, and what are consequences of what is possible."

One of those consequences is a commercial one. Both Pilarski and Backhouse are adamant that any economic benefit

**"If we hadn't been truly bloody-minded about this, and hadn't realized we were going to do this even if nobody believed in us, we would have abandoned it long ago."**

– Dr. Linda Pilarski

from the chip stay in Canada, so they have carefully built a commercial alliance, seeking a broad base of investment, rather than simply turning it over to a single company. The two want to ensure the end result is affordable so "everyone gets benefits, and especially Canadians," said Pilarski.

But for both of them, the commercial incentive is the least of their concerns. It all started with, and comes back to, serving patients. Pilarski says people in her lab notice when blood samples stop coming, because that means those who provided them have died.

"Even though you don't know the people, you feel a real link with them. And you want to be able to help them. Everyone in the lab wants to be able to help, and this is the way we can. The chips have really given us that potential, which is what keeps us passionate about chips," she said. ■





Dr. Marie Cave and Dr. Jean Clandinin came up with an idea of starting a reading group for new physicians over tea at the second-floor café in the University of Alberta Hospital.

# Storytelling in medicine

## Inspiring better clinical practice through an age-old art form

By Geoff McMaster

Some would call it ground-breaking and innovative, others a return to ancient values embodied in the Hippocratic Oath. In an age when the demands of medical training and practice are enormous, two researchers are encouraging doctors to slow down, share their stories and make time for self-reflection. They're using an approach called 'narrative reflective practice,' for which University of Alberta professor Dr. Jean Clandinin has become somewhat famous in education circles. She's a world leader in 'narrative inquiry' as it relates to teachers, recognizing that stories of classroom experience can shed as much light as any pedagogical theory. Clandinin may be a towering name in her field, but she's also just across the street from the Clinical Sciences Building. So when Dr. Marie Cave, a U of A professor of family medicine, realized Clandinin was in her midst, she called her up for tea. Before their cups were drained, they had designed their first project. "It was very exciting to find a kindred spirit, because reflective practice in medicine is very rare," said Cave, who had some exposure to the approach in England. "But Jean had been doing this for umpteen years." The two professors struck up a small reading group of medical students, new physicians and a few more established physicians and gave them books by doctors who recount their own experiences

– Jerome Groopman's *The Anatomy of Hope* and Glen Colquhoun's *Playing God* among them. Like any book club, they would gather every month to compare impressions over food and coffee. "Our intention was to use the books as a starting point for them to think about their own practices – what they were doing, what issues they were confronting, and how they were thinking through their issues," said Clandinin. "So in many ways the books were generative," prompting the physicians to tell their own stories. The group was a great success, so the two researchers then set up another group, this time using "parallel charts," a technique developed by American narrative medicine guru Rita Charon. Physicians in the group would keep unofficial logs on two of their patients, recording impressions that don't make the official medical chart. They would then share these parallel charts with the group. Both Clandinin and Cave are quick to point out, however, that the sessions are nothing like group therapy. Neither are the discussions idle, touchy-feely, subjective explorations of one's emotions. "It's not just about feeling good, or helping patients feel good," said Cave. "It actually makes a difference to diagnosis and management. It's actually clinically relevant, honing those skills, the stuff we don't have time to think about which is meaningful for that particular patient." Cave recalls one physician's story

about an old lady who came into emergency, clearly distraught and uncomfortable with anything resembling a hospital. "No one could help her, because she wouldn't let the doctors near her," said Cave. "But the physician in training sat down with the lady and discovered the reason she was so upset was she was a Holocaust survivor, and coming into emergency was giving her flashbacks." Other staff in Emergency didn't see that the intern was doing anything of much use, besides holding that old lady's hand and calming her down. But members of her narrative group, especially those with more experience, validated her response, and that made a world of difference, says Cave. So far, Cave and Clandinin have been doing this work under the radar, so to speak. They have sought only small amounts of funding from the McLeod Family Medicine Fund and the University Hospital Foundation, mainly to cover the cost of books and sandwiches. The next step will be to seek bigger grants from the tri-council bodies as they launch the next phase of their study. But as with any cross-disciplinary collaboration, they are well aware of the hurdles. "One of the things we haven't tried to do is go to an outside funding body," said Clandinin. "I don't know what SSHRC or CIHR would say if we actually took our proposal to them...Where does it fit?" They admit that communicating their project in a way that does justice to narra-

"It was very exciting to find a kindred spirit, because reflective practice in medicine is very rare."

– Dr. Marie Cave

tive inquiry is not always easy; not everyone sees the value in reflection and sharing and the danger is that with an already overloaded curriculum in medical school, "this could be seen as the fluff," said Cave. But they've also been getting solid endorsements from respected professors in the medical faculty. In their view, what the work comes down to is "respect for the person, and that's why I think this work is really quite revolutionary," says Cave, "to get away from the technological and biomedical perspectives, which are also important, back to why people really enter the profession – to care for individuals." Vincent Lam, author of the Giller Prize-winning collection of short stories, *Bloodletting and Miraculous Cures*, will read from his work and sign books at the Telus Centre Theatre Jan. 16, 5-6:30 pm. It's part of the Faculty of Medicine and Dentistry's Art and Humanities in Health and Medicine program. Admission is free. ■



# Exercising cancer

*Collaboration between kinesiologists and oncologists shows exercise helps cancer patients*

By Caitlin Crawshaw

When it comes to cancer treatment, exercise might seem an unlikely remedy for someone undergoing a draining chemotherapy or radiation regime.

But Dr. Kerry Courneya and his multi-disciplinary team are at the forefront of exercise oncology, a field which studies how exercise can affect the physical and mental health of people with cancer.

"We've had a big revolution in the field of cancer over the last 20 years or so where issues such as supportive care and quality of life and coping with treatments, and these things have become very important," he said. "So, you don't have to necessarily be treating the cancer to have something to offer in the care of cancer patients."

Courneya is a University of Alberta behavioral researcher and Canada Research Chair in Physical Activity and Cancer and is one of a small number of researchers worldwide studying how exercise improves the health and quality of life of cancer patients. This area of study has largely come about due to advances in oncology, which have minimized the harsh side-effects of cancer treatment, like nausea and vomiting, which in previous decades made exercise difficult.

"Now we've got a lot of cancer patients who are going through these treatments who are not too bad. They're coping well; many of them are able to continue work, and so on," he said. "And I think this has also set the stage for the possibility of saying, 'Well now they might be at least in a condition where they can attempt an exercise program,' and whether or not they benefit is what the research program is looking at."

Courneya's research program has involved collaboration between oncologists, epidemiologists, exercise physiologists, biostatisticians, physiotherapists, oncology nurses and others. Since Courneya began cross-disciplinary collaborations at the U of A in 1997, his research has looked at a wide range of subjects, including: how exercise affects the physical well-being of patients during and after treatment, how immune function is affected by exercise, how patients are psychologically affected by exercise, which exercise programs work best for each type of cancer, how exercise programs should be implemented and how exercise can affect the likelihood of cancer returning.

In all of these areas, Courneya's team is breaking new ground.

"Exercise has not been looked at in cancer patients and survivors very much, so almost anything we study is a novel contribution," he said.

The results are promising.

"What we've found so far, at least in the on-treatment phase, is that physical activity can improve physical function during treatment. We're able to help them maintain fitness and improve muscular strength even over the course of these difficult chemotherapy protocols," he said. "We've also found improvements in psycho-social variables like self-esteem, and one of the most novel findings we've just completed in one of our trials, is that exercise resulted in them being able to complete more of their chemotherapy treatments."

Courneya's team has focused primarily on breast and prostate cancer, but is now examining cancers that are under-studied in the field.

None of the research projects would be possible without the help of oncologists, says Courneya.

"I can't overestimate the support I've gotten from the Cross Cancer Institute and the Department of Oncology. That's really what makes the collaboration, when groups of people across disciplines are genuinely excited about collaborating and involved in more than a superficial way," he said, adding that it's particularly important because



Kinesiologist Dr. Kerry Courneya takes some of his own medicine.

oncologists will ultimately be the ones to put the research into practice when they make recommendations to patients.

Medical oncologist Dr. John Mackey is one of Courneya's main collaborators. The two have worked together since 1998, and have published more than 20 papers together. Mackey's research focuses on drug therapy for breast cancer patients, which can be associated with uncomfortable side-effects that can affect the patients' likelihood of completing treatment. The two have teamed up to explore how exercise programs can improve the well-being of breast cancer patients. One recent study specifically examined whether exercise could increase the likelihood of a patient completing chemotherapy.

Their results showed that "both aerobic and resistance exercise increases a woman's ability to get through breast cancer treatment with fewer adverse affects." It showed

that women who did resistance training could more frequently receive 85 per cent of their chemotherapy doses on time.

"In the chemotherapy literature, survival improves when people get past the 85-per-cent threshold of chemo delivery," he said.

This good news is the product of interdisciplinary collaboration, says Mackey.

"It's impossible to be an expert in everything. And not only is it easier to do good research working with experts in other fields, but it's also much more interesting. I find speaking with my colleagues can be boring compared with speaking with colleagues in different disciplines," said Mackey, who frequently collaborates with biochemists, physicists, cell biologists, physiotherapists, advanced practice nurses, psychologists and exercise physiologists.

But not only is collaborating across disciplines "much more fun," it's also a way

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**"Exercise has not been looked at in cancer patients and survivors very much, so almost anything we study is a novel contribution."**

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— Dr. Kerry Courneya

for researchers to stretch their understanding of science.

"Let's face it, with someone in your own field you might be able to debate the minutia, but rarely do you have new insights brought to your attention. I find the intellectual challenge of learning someone else's field and a new way of viewing things...has lead to the most interesting work I have ever done." ■



# So, a cryobiologist and a thermodynamicist walk into a bar...

*The set-up's great, but it's no joke*

By Richard Cairney

Dr. Janet Elliott and Locksley McGann appear to be unlikely collaborators – why is Elliott, a renowned thermodynamicist, working with a biophysicist who's interested in transplantation?

The answer is as impressive as it is simple: they're paving the way towards better cancer treatments, improved preservation of organs and tissues for transplants and even techniques to allow artificial insemination in the pork business.

Each of these projects involves the freezing and thawing of living cells – hence McGann's interest in thermodynamics.

The two met a few years ago at a lecture they'd both been invited to.

"We were introduced, then Locksley said 'Oh, I need a thermodyamacist!' And he took out a napkin and started writing this problem on it," said Elliott.

"She looked at it and said 'Oh, that's simple,'" said McGann.

It wasn't.

"The problem he had written on that napkin, I solved five years later," said Elliott. "I had to come up to where the field is before I could add anything new to it. The paper based on that problem is just now about to be submitted to a journal."

That fact underscores a common issue in interdisciplinary work: "In the beginning, we had to work hard just to understand one another," said McGann. "She is working at a very high level in one field, and I am working at a high level in another field."

It took time, but between the two of them, McGann and Elliott have made some tantalizing advances in research. One area the two are investigating is what happens to cells when they are frozen. If ice forms inside the cells, it is "catastrophic," Elliott said. And when ice forms outside of the cells, it can alter the water and salt content inside the cell, she said. So there are many

**"In order to have true collaboration you need to have trust. You aren't turning a biologist into an engineer or turning an engineer into a biologist, so you need to trust one another's knowledge."**

– Dr. Locksley McGann

variables to consider. But they've made progress. The two are now able to make accurate mathematical predictions about the outcomes of their experiments, allowing them to focus their lab work on projects with a higher chance of success.

The pair has also managed to preserve blood stem cells without the use of toxic cryoprotectants.

Over time, the two came to have a greater understanding of one another's discipline, but neither can claim to be experts in both.

"In order to have true collaboration you need to have trust," said McGann. "You aren't turning a biologist into an engineer or turning an engineer into a biologist, so you need to trust one another's knowledge."

Another essential ingredient to successful collaboration is support.

"You need to do what (Folio) is doing – you need to show that it is something that's valued," said McGann. "And you need time to make it work."

Elliott, who is being awarded the Martha Cook Piper Research Prize this spring, says time is a priceless commodity in collaborative work. When she and McGann first began working together, progress came slowly.



Biophysicist Dr. Locksley McGann teamed up with thermodynamicist Dr. Janet Elliott to unlock cellular mysteries.

"We didn't publish anything for five years," she said. "Our FEC had to wait for this. We were publishing in our respective fields but the thing is we put a lot into that collaboration before we were seeing results."

"And you can't force collaboration to happen – you can't make those people meet. It just happens that cryobiology needs thermodynamicists and I am a thermodynamicist who likes to work in other fields."

Part of the formula that kept the two working together was a graduate student whose work the pair jointly supervised. The two have since supervised several

students – one of which recently accepted an unsolicited offer to conduct postdoctoral work at Harvard Medical School.

"Students are the glue that holds this together," McGann said. "And a lot of students are attracted to this kind of environment."

There's one other thing. McGann says curiosity drives interdisciplinary work. And it's important that researchers have a common personality trait. "We're both stubborn," he said of his work with Elliott. "We're both stubborn and we knew there was a light at the end of the tunnel. We could see something good would come of this." ■

## Engineers at the forefront of medical research

*Scoliosis treatment benefits from interdisciplinary collaboration*

By Caitlin Crawshaw

For scoliosis patients at the Glenrose Rehabilitation Hospital, there is nothing abstract about interdisciplinary research – creative collaborations mean better treatments and greater quality of life.

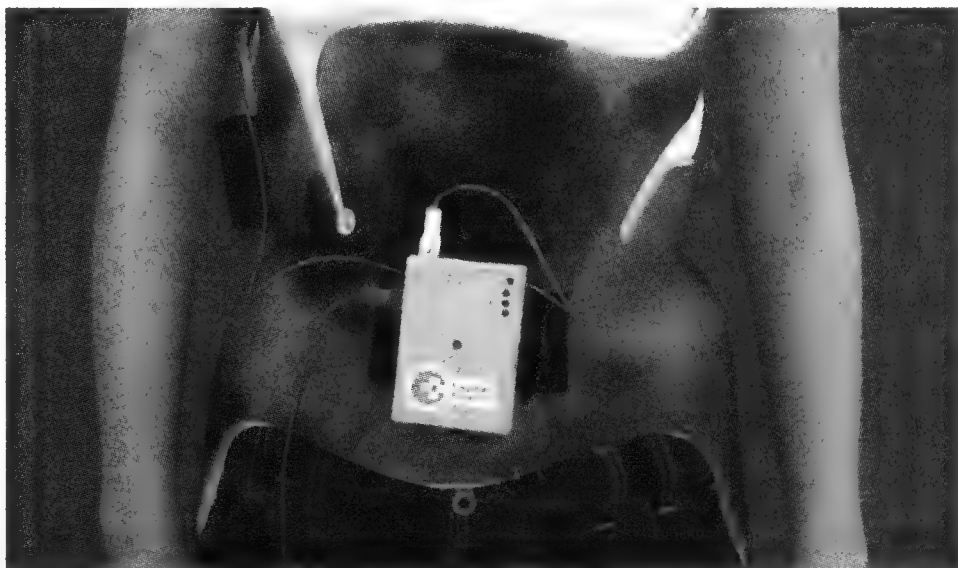
Located in the hospital's Scoliosis Clinic, the Orthopedic Engineering Research Group (OERG) works with experts in a variety of disciplines to understand, treat and assess scoliosis – an abnormal curvature of the spine which can limit range of movement, cause pain and result in an asymmetrical look to the torso.

University of Alberta engineering researchers develop diagnostic tools and brace technology to facilitate more accurate diagnoses and better treatments, decreasing the need for surgical intervention.

"It's a failure if a child comes here and ends up having surgery – we don't consider those successes," said Jim Raso, who heads up the OERG and is associate director of the Glenrose Rehabilitation hospital, as well as an adjunct professor in the U of A Departments of Mechanical, Electrical and Computer Engineering.

The research group also includes Dr. Edmond Lou, an electrical and computer engineer and adjunct professor in the U of A Departments of Electrical and Computer Engineering, Pediatrics and Surgery, specializing in microcomputer and non-surgical treatment for scoliosis and a clinical engineer Doug Hill, who focuses on implementing research at the clinic. All three have worked with the clinic for decades – Raso helped establish it during the mid-1970s.

The group works with an eclectic team spanning many disciplines, includ-



A patient wears an active bracing system, in which a scoliosis brace automatically tightens itself if it has loosened. The device is one of many developed by the Orthopedic Engineering Research Group, a group of University of Alberta engineers who work out of the Scoliosis Clinic at the Glenrose Rehabilitation Hospital.

ing surgeons from the Department of Surgery, researchers from the Faculty of Rehabilitation Medicine, experts in anatomy, radiology and diagnostic imaging, and even a physicist.

One of the group's many research projects includes "smart orthotics" – a computerized, self-tightening brace.

"Children with scoliosis may have to wear a brace for 23 hours a day," said Lou.

The hard shell holds the curve of the spine in place, forcing it into proper alignment, but its effectiveness can be compromised by daily activities, which can cause the brace to loosen.

"One of my systems is able to maintain the interface pressure between brace and

body. So if the system senses it's too loose, it will pump air into the force pad area and when it's too tight, it will release the air," said Lou.

The group is also developing computer software to accurately measure the physical surface of the back.

"Surface typography produces a map of the back and shows where the bumps and valleys are," said Raso.

The technology allows clinicians to track physical changes associated with scoliosis and determine if there have been changes to the spinal curve. This offers some information that an X-ray can't provide. While X-rays are low-dose, radiation exposure is still a health concern for clinicians and patients.

In addition to treatment and diagnosis, the research group is also studying why patients develop the condition. "The \$64,000 question is cause," said Raso, adding that the scoliosis clinic will soon be recruiting molecular biologists to look at causes of the condition in children.

In addition to transcending disciplinary boundaries, the research group is crossing national borders. It is collaborating with Utah State University and institutions in Hong Kong where Lou's bracing technology is being employed.

As engineers, Raso, Lou and Hill admit they never anticipated collaborating with so many disciplines.

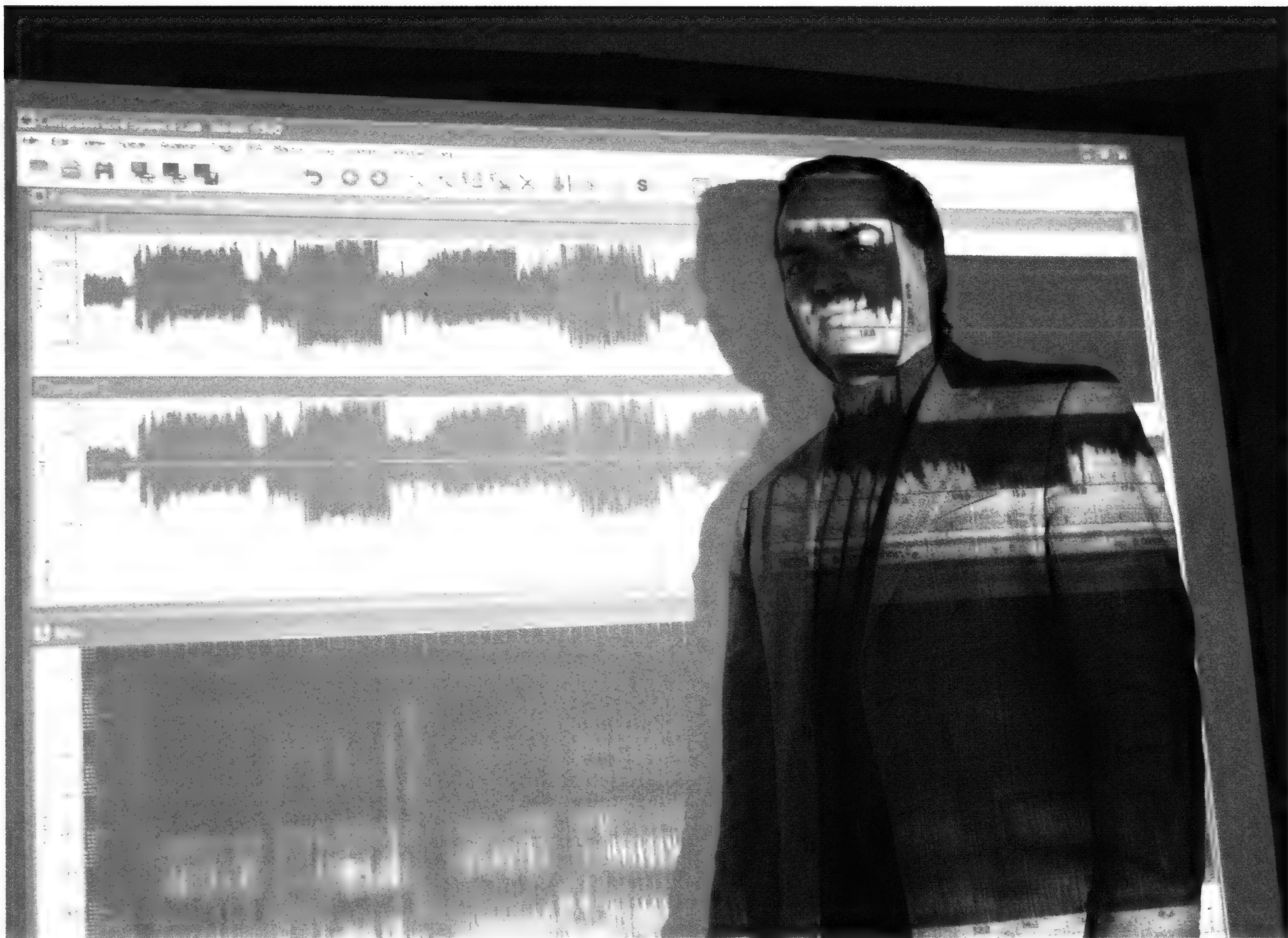
"It's been a real education for us to see how people from different areas approach problems differently, and have different insights as to what's causing the problems and what the solutions may be," said Raso. "It's discussing these issues with people from different backgrounds that lead us to finding solutions more quickly."

Lou believes the growth of interdisciplinary research has a lot to do with the rise of technology. "A lot of the problems we tried to solve in the early days have been solved by technology, so we can move on."

In the modern era, interdisciplinary research has become a necessity, says Raso.

"One of our colleagues said, 'We've solved all the easy problems.' There's a lot of subtle things we're trying to extract from the problems we're facing today. And it becomes then very helpful to have different viewpoints on those subtleties, and how they play out on a particular problem area." ■





Dr. Laurier Fagnan in the newly opened vocal acoustics laboratory. The lab will not only benefit Fagnan's study of the *bel canto* singing method, but will be used by researchers from a wide range of fields, including drama, linguistics and speech pathology.

# Exploring the 'beautiful voice'

*Vocal acoustic laboratory is music to the ears of linguists, dramaturges, teachers, even therapists*

By Geoff McMaster

It's a hackneyed adage, but also the new cardinal rule of the technological frontier: if you build it, they will come. In an era of high-tech wizardry, tools and infrastructure themselves often lead the way to innovative partnerships.

There is perhaps no better recent example than Dr. Laurier Fagnan's vocal acoustic laboratory. Designed to gauge every aspect of choral voice production, the laboratory has state-of-the-art tools and software for measuring everything from breath pressure to contact of the vocal chords to movement of the chest cavity to even the amount of nasality produced during singing.

Its main purpose is to explore just how a choir makes the most beautiful sound possible, according to principles of the centuries-old Italian *bel canto* singing method.

"A huge thing for me is maximizing energy and minimizing effort, which is embodied in muscular tension and excess breath pressure, which are the two enemies of the voice," said Fagnan. "The two friends of the voice are beautiful, efficient vibration of the vocal cords, and complete exploitation of the resonant system."

As Opera singer Maria Callas put it, when you're singing properly, the "voice makes love to the body."

But Fagnan is well aware that the voice also makes love to the body when it speaks properly – on stage, in the classroom or in a second language. And that's where the possibilities open up for all kinds of creative collaboration.

Fagnan works at Campus Saint-Jean, after all, the only post-secondary institution west of Winnipeg where students can

study in the French language. And so, U of A linguist Dr. Martin Beaudoin is poised to examine how one produces a proper French accent – with the right placement of the tongue on the palate, for example, or the right amount of nasality.

But beyond home turf, researchers Edmonton's Glenrose Hospital is also looking at Fagnan's lab with interest, specifically examining how sustained singing might help patients with Parkinson's disease improve their speaking ability.

The lab has also caught the attention of Elizabeth Moulton, voice and speech instructor for the U of A's BFA acting program. Normally she sends her first-year students to master's students in speech pathology for voice assessment, who then measure the actors' progress a year later.

"But I thought, with a lab like Laurier's, we could have the students just play – shouting, screaming, calling, laughing, singing, loud talking crying, all those kinds of things, and see what kind of breath capacity it takes to sustain that in a healthful way," said Moulton.

"That's really useful to actors, to see what happens, how off the scale they go, and how they can even out the tone a little bit and change the placement of where the noise comes from."

Fagnan says principles of *bel canto* singing can be easily transferred to the spoken voice, and therefore the dramatic stage. "Then you're not harming your voice, and it's going out with colour," he said. "It has good tension, and people can hear the character and person behind the sound. I think it will really help with developing fullness of character...If you can dip into the whole sound, then even when you

speak softly, it's going to carry."

The acoustic lab is invaluable for dialect training, where placement of vowels is so crucial, says Moulton. The tools in the lab would allow those learning dialect to actually see when they get the pronunciation and intonation right, so they can more easily repeat it.

"You see these dots appear on the screen, and then you change your placement to match where the dots go. It's a wonderful biofeedback mechanism...Where the dialect is placed has huge influence on the speech sounds that end up coming out, and tunefulness or pitch patterns."

But there is probably no group of professionals more desperate for sound research on voice production than classroom teachers. They receive little vocal training, and put inordinate amounts of stress on their voices every day.

"I have a lot of personal friends who come to me because they have this chronic problem," said Fagnan. "Eight hours a day of screaming over kids is very tiring, whereas if you use good vibration and resonance in the absence of breath pressure and muscular tension, you can speak till the cows come home."

To investigate that problem, there is yet another new tool available, which Fagnan has on order, measuring stress on the voice over an eight-hour period. "You can see what the vocal chords are doing throughout the day, and it will tell you at what point you started getting horse, at what point you started using more breath."

The potential uses for his laboratory seem endless, says Fagnan, a little overwhelmed at the thought. While he'd like to participate in all of them, for now he has to

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"Sure I'd like to publish articles in

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immediately applicable."

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– Dr. Laurier Fagnan

stay focused on what he does best: music and singing.

But even there, there are fascinating prospects for innovative partnerships. The autolaringologist with Paris Opera would like to explore the choral voice with Fagnan, especially given his connection already with IRCAM (Institute for Research in Musical Acoustics).

Yet what matters most to Fagnan is the 'beautiful voice.'

"Sure I'd like to publish articles in scholarly journals, but what interests me is having more beautiful sound out there that is able to carry. I want it to be immediately applicable," Fagnan said.

"There's nothing like changing a choir's sound in an hour and having it sound so much fuller and more beautiful and complete in the human sense, and more in tune. And if these tools can help unlock ways in which we and other conductors and singers, teachers and actors can use their voices in a more effective manner, that's my ultimate aim." ■



# Sparking the entrepreneurial spirit

**TEC Edmonton program mixes research and business**

By Richard Cairney

A unique pilot project by TEC Edmonton is bringing MBA students together with other students who have research ideas and a desire to bring them to the marketplace.

The program is designed to bring new knowledge and technology to the marketplace.

Joe Patton, who is working on his PhD in plant genetics, has teamed up with MBA student Han (Tony) Li. Patton is developing new plant genetics technology that could solve a major problem in the genetic modification of plants.

At present, genetic modifications are made for a number of reasons. Some crops, for example, are altered genetically so they are resistant to a specific herbicide. This allows farmers to get rid of weeds without damaging their own crops.

"The big problem is that because they put these genes into the nucleus of the plant, it gets into the pollen and it gets dispersed into neighbouring crops and related weeds," said Patton. Insects, birds and even wind will carry the pollen from modified crops to unmodified crops.

"There is a case right now in Saskatchewan where organic farmers are suing because their organic crops can't be guaranteed as organic, because they can't guarantee what is genetically modified and what isn't."

Patton is working on a technique that could ultimately solve the problem.

"Once this platform is out there, if I can get this to work, it will be a tool that will enable more people to do that type of

research. I think that the bottleneck right now is access to that kind of technology."

Patton's MBA partner Li says the work is a natural evolution of existing technology.

"Several years ago people used DOS as an operating system on their computers and today they're using Windows. The new technology used by Joe can create a new platform for bioscience and agriculture research," Li said, adding that the program provides him with valuable lessons.

"To have something in the real world to practice your skills on is very important, especially for MBA students. We learn a lot from text books: finance, accounting, marketing and so on. But nowadays for an MBA program, a lot of them are based on case studies but case studies cannot replace real work experience," added Li, an international student from Tian Jin, China's third-largest city.

Both students have considerable experience behind them. In China, Li earned his masters degree in chemistry. He worked for the Chinese Academy of Science as a researcher then moved into sales and marketing with General Electric's thermoplastic division, before joining Clariant.

At Clariant, he used his previous experience to solve a vexing business problem: the plastics industry couldn't meet the rapidly changing demands of the cell phone industry for different colours of plastics. Clariant had a technology that would solve the problem, but wasn't aware of the cell phone's need for it. It was only through Li's initiative that the problem and solution were paired up.

"It was a totally new market for Clariant, so I introduced the technology to Motorola and Nokia. In my last year at Clariant, I doubled my sales in just six months."

For his part, Patton has been working for several years on developing the new technology and bringing it to the market, earning degrees in science biotechnology, law, and his MBA in order to bring his dream to life.

"I have spent seven or eight years thinking of this. It is one of the reasons I have done those two other degrees, to deal with intellectual property aspects," said Patton, who heard about the pilot project while working in TEC Edmonton's legal department while working towards his MBA.

Pamela Freeman, TEC Edmonton's vice-president of company development, says the program, run with Alberta Ingenuity, also provides student teams with industry mentors.

A technology commercialization body operated by the U of A and the Edmonton Economic Development Corporation, TEC Edmonton will also provide assistance in issuing patents on behalf of the students, Freeman said.

And the most promising pairs could get an audience through TEC Edmonton's Deal Generator, a program Freeman describes as "the largest angel investment group in Canada."

Patton says he's getting something out of working with Li, not only because of Li's business acumen but also because Li is an

**"To have something in the real world to practice your skills on is very important, especially for MBA students."**

— Joe Patton

international student.

"Tony has got a pretty good background and he has done a lot of work for some chemical companies in China and has a pretty good hold on how to rule out which things won't work, which is half the battle," he said. "It's kind of nice to be able to draw a line through something and say 'That won't work' and stop wasting time on it. He's able to see things I may have over looked or not considered at all."

"And in China, culture isn't just limited to people's social lives. It has tremendous effect on the way people do business. There is so much more based on relationship there than there is here."

Li knows his international experience is a strength.

"The Chinese people and people from the U.S. or Europe will have very different approaches to solve the same problem," he said. "I try to use my previous experiences, my special approach, to solve problems in North America in Canada."

Freeman says the pilot program will be evaluated this spring. ■



Joe Patton, seen here working in his lab, is developing new technology to improve research into genetic modification of plants. He's working with MBA student Tony Li to help commercialize the process.



# Scientific sleuthing

*Dr. David Wishart employs interdisciplinary methods to identify the biochemical fingerprints of disease*

By Rick Pilger

On the southern edge of the main campus, the university's health sciences complex throbs with a feverish energy: a swarm of students and staff come and go, patients and their visitors spill out on to the sidewalks, emergency vehicles scurry to and fro, construction cranes scar the skyline as creations of concrete, and steel and glass rise up to replace the tired structures of brick and wood that once claimed the ground.

From the steps of Athabasca Hall, basking lazily in the record-breaking heat of an early July day, the impassioned war on disease seems far away. But inside this building, the university's first home on campus and now part of the computing science complex, is the nerve centre of a project that could conceivably have a greater impact on the practice of medicine than anything else ever done on the University of Alberta. Or almost anywhere else, for that matter.

The initiative is called the Human Metabolome Project, and the idea behind it is extremely simple: to make it possible to identify the biochemical fingerprints of disease. Analogous to the marks left by loops and whorls of skin would be the signature traces of metabolites – those small molecules that result from the biochemical modification of chemical compounds in living organisms and cells – identified using nuclear magnetic resonance (NMR) spectroscopy.

To this end, the Human Metabolome Project has undertaken the identification, quantification, cataloguing and storage of all metabolites that can potentially be found in human tissues and biofluids (blood, urine, tears, etc.) at concentrations greater than one micromolar (a millionth part of a litre).

To date more than 800 metabolites have been identified, and it's expected that by the end of 2006 a total of 1,400 such compounds will have been characterized, quantified and archived into databases accessible through the Internet. In addition, pure samples of each metabolite will be preserved by storing them in freezers at a temperature of -80° C.

The motivating force behind the Human Metabolome Project is a U of A scientist whose relentless curiosity isn't confined by traditional disciplinary boundaries. As an undergraduate at the U of A, Wishart majored in physics. After earning two graduate degrees at Yale – in molecular biophysics and biochemistry – he returned to the U of A as a postdoctoral fellow with the Protein Engineering Network of Centres of Excellence.

When he was ready for a continuing faculty position, despite lucrative offers from numerous suitors at other institutions, he decided to stay in his hometown and accept an appointment in the U of A Faculty of Pharmacy and Pharmaceutical Sciences, where he currently holds the Bristol Myers Squibb Chair in Peptide Metabolism.

He accepted his academic staff position a dozen years ago – not a long time by some measures, but ample time for Wishart, who now has joint appointments in the Departments of Computing Sciences and Biological Sciences, to establish himself as one of the university's premier scholars.

Wishart was only four years into his new academic posting when his current project took wing, and he has no difficulty recalling the seminal moment to which the Human Metabolome Project owes its existence. It occurred as Wishart was preparing to deliver a guest lecture about how NMR spectroscopy could be used to diagnose or monitor disease. He was scanning some of the more obscure literature on the subject when his attention was suddenly galvanized.

“What metabolomics promises, is a list of some 2,500 molecules and the technology to potentially measure maybe 300 or 400 of those all at once. It will change the way that diagnostic testing is done – and the way that most clinical chemistry is done.”

– Dr. David Wishart

“Something just jumped off the page at me,” he said. The object of his interest was an illustration showing how markedly the NMR spectrum generated from the blood of someone suffering from Fanconi's Syndrome (a rare kidney disorder) differed from that of a non-sufferer.

“It was immediately obvious how different it was,” said Wishart, who was struck so forcibly by the illustration because a close relative of his had just been diagnosed with that very syndrome – but only after a decade of “bizarre tests and treatments.”

“That got the wheels turning,” said Wishart, who began thinking about the exciting opportunities for using NMR spectroscopy, with which he was extremely familiar, for disease diagnosis and monitoring. Ironically, the resulting Human Metabolome Project owes as much to what Wishart, with his broad and extensive scientific background, didn't know as to what he did.

“In our naivety of how it was supposed to be done, we started dealing with spectra differently,” he said. While other labs interested in the NMR spectra of biofluids were looking at the spectra simply as amorphous shapes to be compared one to another, Wishart took his lab in another direction. “Our concept was, ‘let's figure out what every single peak represents’ – we didn't know that you weren't supposed to do it that way.”

To enable his approach, Wishart devised some novel techniques that led to two patents and a spin-off company named Chenomx Inc., which exploits those techniques to develop software for NMR analysis of complex mixtures for broad application in life science technologies.

Once Wishart had the tools in place to dissect the spectra, identifying the compounds present and their quantity, he was faced with filling a massive void: there simply wasn't a good library of all the small molecules that might be encountered in human biological fluids or cells. “It was like trying to put together a jigsaw puzzle with pieces missing,” he said. “The analogy would be a puzzle of 1,000 pieces missing 800.”

The Human Metabolome Project is the attempt to find all those missing pieces and finally put the puzzle together into a coherent image. In many ways, it parallels the Human Genome Project, which was completed in a sort of first draft form in 2001 and finalized in 2003. That project was tasked with determining the sequence of all of the genes and all of the chromosomes in a human cell. That took about 12 years to complete and cost almost a billion dollars.

While the Human Metabolome project, which was launched in 2005, is a much



Dr. David Wishart, who is jointly appointed to the Departments of Computing Sciences and Biological Sciences, is one of the U of A's leading interdisciplinary scientists. Wishart heads up the Human Metabolome Project, an cross-disciplinary project dedicated to determining the biological 'fingerprints' of disease.

more modest undertaking – its budget is nowhere near a billion dollars – it has the potential to change the way medicine is done. Testing for small molecules – in blood and urine particularly – is already an important part of medicine, but currently doctors rely on a small set of tests that focus on less than two dozen molecules.

“What metabolomics promises, is a list of some 2,500 molecules and the technology to potentially measure maybe 300 or 400 of those all at once,” Wishart said. And the testing, he adds, would be much, much faster and much less expensive – costing only pennies and done with a handheld device in the doctor's office. “It will change the way that diagnostic testing is done – and the way that most clinical chemistry is done.”

The intention of the Human Metabolome Project is to provide the tools that will enable that change to take place. “What we want to do is provide the Rosetta Stone for the future of metabolomics. We want to say ‘These are the compounds that are part of your body. Here's our parts list. Here are the instructions. Here's how they work. Here's how they relate to disease. Here's how they relate to genetics.’”

While the Human Genome Project was a worldwide effort, the Human Metabolome Project is entirely based in Alberta. Other research groups around the world are interested in metabolomics, but what is happening in Alberta is unique. “We planted the flag in the ground first,” said Wishart, “and others are letting us finish.”

Wishart, who acts as project leader, is one of nine principal investigators involved in the project. In addition to Wishart, seven others come from the University of Alberta – Brian Sykes (Biochemistry), Russ Greiner (Computing Science), Fiona Bamforth (Clinical Chemistry), Derrick Clive (Chemistry), Liang Li (Chemistry), Mike Ellison (Biochemistry) and Tom Marrie (Medicine) – and biochemist Hans Vogel contributes NMR spectroscopy expertise from the University of Calgary.

Another 30 individuals work on various aspects of the project, which has a very small physical footprint – one small office in the south wing of Athabasca Hall, ordinary in every way, is pretty much it – making use of existing facilities and primarily functioning as a virtual entity.

Project manager Lori Querengesser has a particular interest in the bioinformatics tools being developed to facilitate the project. (Bioinformatics is the use of techniques from disciplines such as mathematics, statistics and computer science to solve biological problems.) Among these tools is a program called Biospider, which has been used to search the Internet and bring back any data it finds about metabolites.

According to Wishart, the study of small molecules was where biochemistry began, and as long ago as the beginning of the 20th century people were writing about and describing small molecules.

*Continued on next page ►*



# Math matters

## Centre for Mathematical Biology facilitates interdisciplinary work on campus

By Caitlin Crawshaw

Dr. Mark Lewis knows big ideas can mean big numbers.

Whether he's studying the dispersal of wolves in Yellowstone National Park, predicting the risk of West Nile virus infection, or examining the relationship between salmon farms and sea lice, Lewis often deals with massive data sets.

When it comes to making sense of the data, mathematics is critical, and on that point Lewis' expertise as a mathematical biologist has served him well – and it's benefited countless disciplines and researchers across campus.

Lewis is director of the University of Alberta's Centre for Mathematical Biology, housed in the Department of Mathematical and Statistical Sciences. The centre helps researchers in many fields develop and use mathematical models to understand biological measurements and observations.

"We collaborate with a lot of people on campus on interdisciplinary projects. We typically work with other scientists on things where math and biology come together," he explained.

Mathematical biology, he says, allows scientists to put data into mathematical formulas and computer programs make predications about outcomes that they might not make otherwise, he said.

The centre is inherently interdisciplinary, and interacts with many departments on campus, including the Department of Biological Sciences, Department of Obstetrics and Gynecology, the Department of Oncology, the Department of Renewable Resources and the Department of Biomedical Engineering.

The centre also facilitates research "from a microscale to the ecosystems scale," said Lewis.

One of the centre's faculty members, Dr. Gerda de Vries, is heading a team that's examining protein binding in cells and investigating the ways that math can be used to understand the process. Another research project involves de Vries and colleague Dr. Thomas Hillen, and is focused on understanding how tumors respond to radiation during cancer treatments.

Most of Lewis' own research takes place on a large scale, including his work on mountain pine beetle infestation – he created a mathematical model of the infestation patterns of the beetle, which has devastated forests across British Columbia and is now poised to spread through Alberta and the rest of the country.



Dr. Mark Lewis is the director of the Centre for Mathematical Biology, a hub of interdisciplinary research on campus.

While the field of mathematical biology is critical to many disciplines, it is relatively new.

"It's really emerged as a discipline strongly in the last 15 - 20 years. Prior to that, there wasn't a field recognized as 'math biology' even though people worked in the area," he said.

Lewis says the discipline is gaining momentum because of advances in science and technology.

"The reason the subject is becoming so exciting is because now there's amazing data sets that we can get, and now we have powerful computers and complex questions we're trying to answer," he said.

As a result, computers and mathematical models are required to digest the complexity and breadth of information that researchers are now able to produce.

Another consequence of these changes within science has been the rise of interdis-

"The reason the subject is becoming so exciting is because now there's amazing data sets that we can get, and now we have powerful computers and complex questions we're trying to answer."

– Dr. Mark Lewis

ciplinary research, as experts in different fields collaborate to address increasingly complex questions. When experts from different fields collaborate, as they often do within mathematical biology, a centre can help bridge the gap between disciplines, says Lewis.

Mathematicians and biologists "often speak different languages when it comes to their disciplines, and have different approaches, so there's a lot of learning that goes on," he said.

Beginning an interdisciplinary research endeavour can be "hard to set up without some help, because you have to learn the area you're collaborating in, you have to find a way to communicate effectively your methods and approaches, and you need to have a place to meet physically and interact," Lewis said.

The centre might also be classified as cross-generational, as the facility trains young scientists in the discipline, as well.

"We run an undergraduate summer student course. It's really for math students. When they've done three years of math, we invite them to come here for 11 days for a workshop on how to do mathematical biology," said Lewis.

A strong supporter of interdisciplinary research, Lewis says collaboration is valuable on a number of levels. In one sense, it helps scientists solve problems quickly. Questions may have been answered in one field, but not in another.

"Maybe a biological question comes up, and math has spent a lot of time working on something closely related," Lewis said.

"That's one half of the picture, and the other half is that the biological problems provide really interesting math challenges, so it can really enrich the field." ■

## Scientific sleuthing

► Continued from Page 14

"For the next half century, that's all biochemistry was," he says. However, in the 1970s, molecular biology took over, and with the interest in cloning and similar pursuits, small molecules were largely forgotten.

The first stage of the Human Metabolome Project was largely what Wishart describes as a "backfilling process – searching out what had already been learned about small molecules and entering that information into a database. The project has now moved into its second phase – using clinical samples to measure and identify the compounds present. In some cases these are things that have never been seen or described before.

Because it is necessary to identify everything that could be found in a human body, Wishart and his colleagues have turned their attention to substances that are not naturally ingested, including drugs and food additives. In fact, an offshoot of the Human Metabolome Project is the world's most complete drug database, DrugBank ([www.drugbank.ca](http://www.drugbank.ca)), which

contains detailed information about nearly 4,300 drugs. This includes not only such things as the chemical structure and the molecular weight – and, of course, the NMR spectrum – but also patient information, including possible side effects and contraindications.

"DrugBank was good practice," said Wishart. "We cut our teeth on it. We knew that the information we wanted had to be somewhere. We just had to go out and find it."

Without the support of Genome Canada, the federal agency created in 2001 to serve as Canada's primary funding and information resource for genomics and proteomics, the Human Metabolome Project might never have gotten off the ground. The project was made possible by a \$7.5 million grant issued under Genome Canada's Applied Genomics and Proteomics in Human Health funding umbrella.

Although the Human Metabolome Project slightly pushes the envelope of what Genome Canada typically funds, it has generated a great deal of enthu-

siasm. "This project has the potential to be among the highest profile activities taking place in Alberta universities," said Gijs van Rooijen, the chief scientific officer for Genome Alberta, the organization set up by Genome Canada to oversee genomics infrastructure and research in Alberta. "People around the world are looking carefully at what it is doing, and a number of international efforts are prepared to team up with it."

The initial start-up capital for the Human Metabolome Project came as a result of a funding competition that saw an international scientific review panel consider applications and give the Alberta project one of the highest ratings.

Recently, the Project underwent a mid-term review by internationally respected scientists, and the results were equally as encouraging. "Again, the Project received one of the highest rankings," said Van Rooijen. "It had done all it said it would and more."

Van Rooijen adds that the Human Metabolome Project is building on existing

strengths at the U of A and the University of Calgary – strengths in NMR technology, bioinformatics, chemistry, and medical laboratory science. And, he says, the cooperation is building strength upon strength. "Traditionally individual chemists, biologists or computing scientists make individual discoveries. This project brings all the discoveries under the same umbrella and the whole is definitely bigger than the individual parts."

Wishart says that, if all goes well, he and his colleagues should have the first version of the Human Metabolite Database ready for release to the public by the first day of 2007. Researchers will then be able to translate the information it contains – the relationship of the various metabolites to genes and proteins, pathways and disease – to tests that will inform medical practitioners in their offices.

"Everything tells us that knowing this information is what physicians are looking for," said Wishart. "The bottom line is that we will be able to diagnose most diseases better, faster and cheaper." ■



# Looking at the business side of the puck

*Augustana profs find it's all fun and games until someone loses their shirt*

By Mark Wells

It's hard to remember that it's just business when you're wearing nothing but blue and copper body paint, and screaming "GOOOILERS" at the top of your lungs in sub-zero temperatures.

But the reminder inevitably arrives, either a credit card bill for those playoff tickets, a light wallet after a night at the sports bar or a burning feeling of betrayal after a key player gets traded for wheelbarrow loads of money. Such is hockey.

However, as familiar as such scenarios are to fans, seldom are the fan and business sides of the sport brought together for academic study. Augustana's physical education professor Stacy Lorenz and economics professor Bill Foster have decided to team up and offer a new course in 2007 that will change that.

The course, tentatively titled *Hockey: Culture and Commerce* will be offered in the management and economics stream.

Foster has done in-depth studies on what factors make teams win or lose in the sports of baseball and hockey.

"Hockey is complex, baseball is simple," said Foster. "In hockey, strategies like five-on-five play and penalty killing help; in baseball it's about owning resources, like buying players."

The value of such studies are obvious to anyone with a mind for money: professional sport is a \$500 million per year business. Lorenz comes into the picture by providing the historical background to the sport, along with analyses of the role of masculinity, violence and fan-building in the sport.

"Hockey's always had a business side, but it has also had very strong and deep-rooted cultural meanings, whether those are associated with local identities and civic pride and boosterism, or whether

those are identities associated with masculinity and toughness and building character, or if it is feelings of nationalism," Lorenz said.

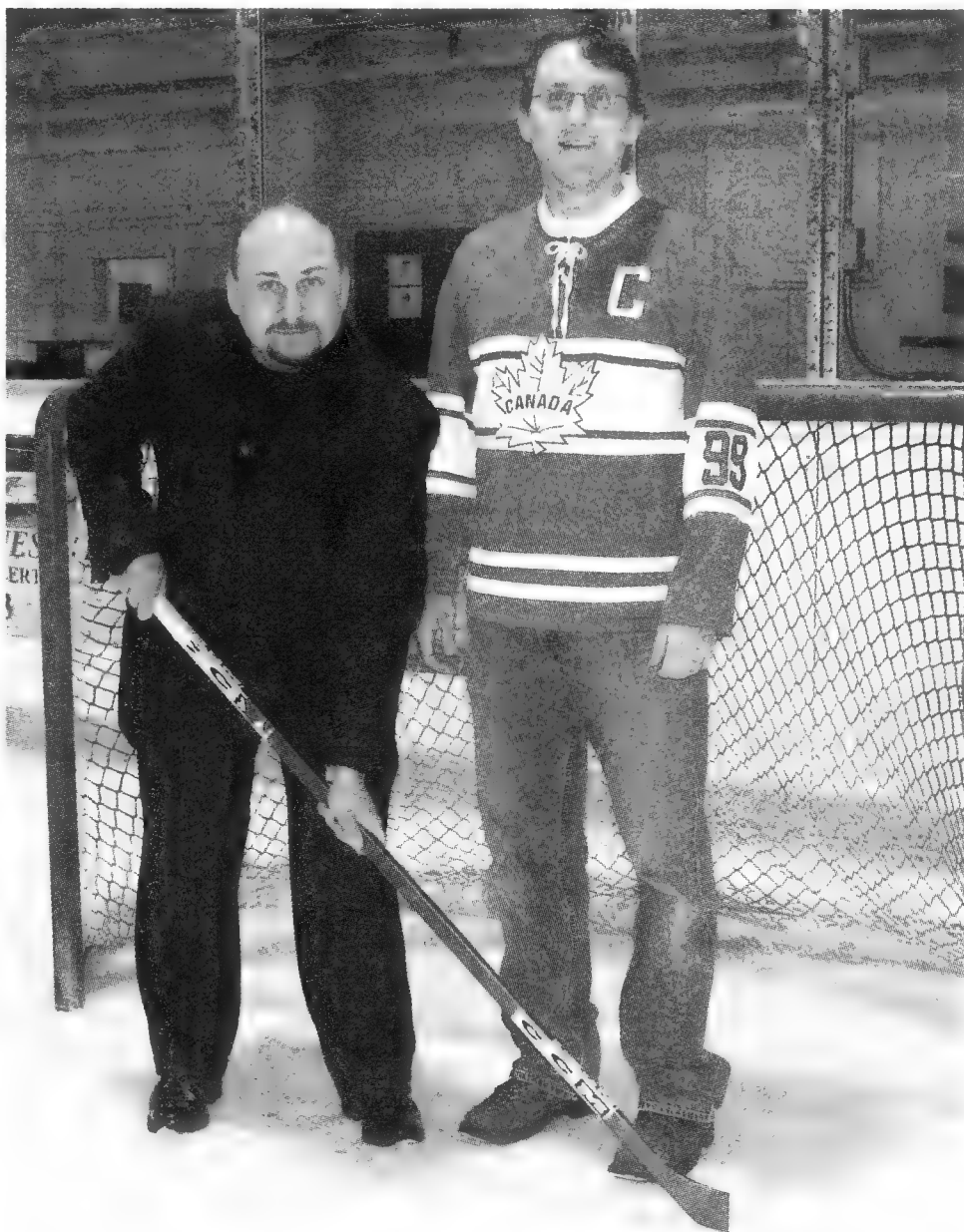
So what happens when you put the two disciplines together? Well, for one, you can get a better historical understanding of the cultural impact of Wayne Gretzky's trade to Los Angeles on the city of Edmonton and the success of hockey more broadly. And you can learn how the negative feelings that came with the deal were tied to larger pan-Canadian issues of economic nationalism in the late 1980s.

From a strict business perspective, Foster offers that Gretzky's move was the best possible thing that could have happened to the game. Number 99's star power helped open new expansion franchises in the United States, and therefore made the sport more financially lucrative. But that financial health was also threatened by the expansion, because wealthy U.S. teams were suddenly able to purchase the talent necessary to win, Foster added.

The NHL is essentially a professional hockey monopoly that can only succeed with "outcome indeterminacy." When the Stanley Cup winner is a foregone conclusion, or at least when one can determine which teams won't make the playoffs, fans lose interest, and so does the business at large.

"Part of what we've tried to do at Augustana that makes us unique are these interdisciplinary and collaborations between faculty members. We would see this course as part of that ongoing experiment," said Lorenz.

*Hockey: Culture and Commerce* will be offered at Augustana in the Fall 2007 term. ■



Augustana economics professor Bill Foster (left) and physical education professor Stacy Lorenz explore the business side of Canada's favourite sport.

## Putting literature in the law books

*Unique pairing of disciplines looks at case study in fiction*

By Zoltan Varadi

Did Grace Marks murder Thomas Kinnear and Nancy Montgomery?

The jury in the 1843 trial certainly thought so, sentencing the housemaid, who was 16 at the time of the crime, to hang for her part in the killings of her employer and his mistress (her sentence was later commuted to life in prison).

An interesting case in the annals of Canadian judicial history to be sure, but students who took *Jurisprudence (Representations of Law in Literature)* this last semester didn't turn to the actual case history when they examined the proceedings, but rather Margaret Atwood's fictionalized account, *Alias Grace*.

"Is Grace innocent? Is she guilty? If so, how did we find the evidence of that?" asked Dr. Lynn Penrod, a professor in the U of A Department of Modern Languages and Cultural Studies, as well as a lecturer in the Faculty of Law. "What factors seem to make a difference? What's the nature of truth? Because you know, if you've read the book, that Margaret Atwood takes a lot of things that appeared in the newspapers and the students have the chance to examine what is the role of media in the administration of justice."

The course material also includes Charles Dickens' *Bleak House*, Harper Lee's *To Kill A Mockingbird*, the latter being a particular favourite of students, as its lawyer protagonist Atticus Finch is a heroic figure, somewhat of a rarity in terms of depictions of those in the legal profession.

"It's the kind of thing where in a real case you might see something similar. And there are a lot of cases that students read about in law school where at the end of the day you're never sure what the story really was."



Dr. Lynn Penrod's interdisciplinary course, *Jurisprudence (Representations of Law in Literature)*, is a blend of law and literature.

Penrod calls the course, which she has taught since 1986, a true example of interdisciplinary work between the Faculties of Arts and Law. Among the students in the section, you'll find those with undergraduate degrees in genetics, criminology, political science, literature and sociology, she added. Regardless of their backgrounds though, they all share a common interest.

"People taking this section really like to read," she said. "This is, in a way, an excuse for them to get to do some reading that's a bit different but still applies the basic thought process of law. It's all about interpretation."

A similar approach will take place next term in the *Shakespeare Moot Project*, a

course Penrod will teach with Dr. Carolyn Sale, pairing laws students with English students in preparation of a moot. Here the question won't be one of "to be or not to be" but of same-sex marriage.

"Mooting is what you do when you go to law school and you learn how to appear in court and argue a case. But the difference with the Shakespeare moot is that the source of law is located only in the works of William Shakespeare," said Penrod. "It's sort of like debating. You're pretending that you're going to court and there are volunteer judges, usually practitioners or professors, and one side argues for and the other side argues against."

Law students turn to statutes and

"People taking this section really like to read. This is, in a way, an excuse for them to get to do some reading that's a bit different but still applies the basic thought process of law."

— Dr. Lynn Penrod

legal precedents to craft their cases, here they're going to be doing the same thing but they'll only be able to use the plays of Shakespeare to find their arguments.

"It's a situation that has something to do with real life, but obviously you don't have to go looking for the law as it stands in Canada or any other jurisdiction. You just have to go through Shakespeare's plays, and there are a lot of examples in Shakespeare about gender differences and getting married and what marriage means and so on and so forth," she said.

While the law students will use their expertise in constructing the outline of their argument, the English majors, who have all taken at least one Shakespeare course, will help find the plays best suited to further their argument.

"I think you find a lot of times law students are still interested in doing things that are outside of the normal parameters of what they usually do," said Penrod. "Many English students are considering whether or not they'd like to go to law school, so this is kind of a chance for the two sides to get together." ■



# A multi-disciplinary look at the North

*Augustana courses blend outdoor education with Scandinavian and environmental studies*

By Diane Hutchinson

Morten Asfeldt, Dr. Glen Hvenegaard and Dr. Ingrid Urberg come from very different disciplines – Physical Education, Geography and Environmental Studies and Scandinavian Studies respectively.

But working together at the University of Alberta's Augustana Faculty in Camrose, the three have discovered a shared passion for the North and a willingness to turn that mutual interest into a life-altering educational experience for students.

Two different collaborations have emerged. The first, dating back about 15 years, is a semi-annual, 21-day canoe trip in the Arctic, combining the practice of leadership skills in an outdoor setting with research on natural history and conservation.

The trip is led by Asfeldt and Hvenegaard and usually includes 10 students, although 12 are on board for this year. As part of their course preparation, students make decisions about the exact location of their travel, the food they'll take, the partners they'll work with and more. They are each assigned two days of leadership and choose an area of environmental research as well – related to habitat, migration, weather, human impact or some other aspect of the Arctic.

During the trip, students are asked to become spontaneous interpreters of natural history as they reflect on what they see, learn and experience.

The combination of Outdoor Education and Environmental Studies may seem like a natural fit. But where does Scandinavian Studies fit in?

Urberg's *Personal Narratives of the North* course provides a wealth of stories from Canadian and Scandinavian people who have lived and worked in the North.

Twice now, there has been a two-week-long February journey to the Northwest Territories led by Ingrid and Morten. It is the culmination of study for the students. It's a true wilderness experience, with students spending time at an isolated homestead, as well as six days on a dog-sledding expedition.

While on the trail students create their own narrative of their experience. Mornings at the homestead are devoted to



Dog sledding is a big part of the two-week journey to the Northwest Territories that wraps up *Narratives of the North*.

seminars – one of the favorites has been based on a discussion about wolves and their symbolic representation in literature.

In addition to the dog sledding, afternoons at the homestead are spent doing outdoor activities.

It hasn't always been easy to convince outdoor education students of the added value they'll receive from the literary component of their journey, according to Asfeldt and Urberg, but as they become involved they realize how much the narratives and reflections add to the trip.

"We could just go dog sledding, but Ingrid and I realized a much deeper, richer experience could be created by working together," said Asfeldt.

Students may view the trip as a once-in-a-lifetime adventure or as the beginning

of a lifelong relationship with the North. No matter which becomes true for them, they all view it as a phenomenal learning experience that can't be duplicated.

"Each trip is unique," said Hvenegaard. "And there are huge life lessons to be learned from the experience of dealing with factors you can't control."

All three instructors say their own learning has been significant, too, and call the trips a very rewarding component of their work.

Their collaboration continues to open up new avenues and opportunities for them – presentations have been made at various events; a book of narratives is in the works and the three are working together on a session for a conference in Norway next year.

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**"Life is an interdisciplinary experience."**

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– Morten Asfeldt

They acknowledge that their collaboration is unique – colleagues at other institutions don't do trips like theirs.

But as Asfeldt points out, disciplinary divisions are made only for administrative purposes, so this kind of working together could be done between virtually any programs of studies.

"Life is an interdisciplinary experience," he said. ■



Dr. Ingrid Urberg discusses the role of wolves in literature with students of the interdisciplinary *Narratives of the North* course.





Photos: Supplied

# Prof collaborates on tsunami warning system

*Project blends policy, communication and technological know-how*

By Phoebe Dey

A warning system could have saved thousands of lives during the devastating tsunami that struck communities around the Indian Ocean almost two years ago and one University of Alberta expert has been part of putting one in place.

Many of the challenges for public warning in a country like Sri Lanka are oddly similar to those we have identified in rural and remote parts of Canada, such as the west coast of British Columbia ... the hardest part in both cases is the last-mile portion of the system."

— Dr. Gordon Gow

When a powerful earthquake erupted beneath the Indian Ocean, it devastated a long stretch of Sri Lanka's coast, killing 40,000 people and displacing 2.5 million. Nearly two hours had passed from the initial time the earthquake hit until the tsunami waves arrived to devastate coastal villages in that island country – a window of opportunity that should have been sufficient to warn people to evacuate and take cover from the deadly waves about to arrive.

An expert in public safety communications from the U of A is part of a interdisciplinary team of researchers putting an early warning system in place to help prevent such a tragedy from happening again. "An indication of the hazard was available on the Internet 10 minutes after the



Damages to homes in Sri Lanka after the 2005 tsunami disaster, which took the lives of tens of thousands and affected one million people.

earthquake," said Dr. Gordon Gow, from the Faculty of Extension. "However, communication from the outside world and within Sri Lanka failed abysmally." The tragic consequences of the tsunami of December 2004 highlight the desperate need for grassroots warning systems in countries of the Indian Ocean, including Sri Lanka. In January 2005, LIRNEasia, a regional development organization initiated a project to implement and evaluate an

early warning system that could better deal with disasters that strike the area. The program is funded by Canada's International Development Research Centre and involves a number of expert participants, including Gow, who has helped to develop guidelines and procedures for the project. During the past year, the group completed work on a community-based communication network for the project and recently started simulations and exercises

by issuing bulletins through this network. The objective is to be able to identify and assess the risk of a local hazard and then communicate that risk to communities in the area in enough time to take action. Part of such a system included handing over communications technology to the community groups – mobile phones, satellite radios and wireless devices.

Continued on next page ►



# SEE-ing the big picture on energy and the environment

*New school will erase boundaries*

By Richard Cairney

A new University of Alberta teaching and research centre will bring together expertise from all disciplines to make the university the 'go-to place' on energy and environmental matters.

The School of Energy and the Environment (SEE) earned the U of A Academic Planning Committee's approval in late December and will be headed up by School of Business professor Dr. Joseph Doucet.

Doucet, who heads up the Centre for Applied Business Research in Energy and the Environment (CABREE), says SEE will be "a window for the world to see into the U of A, to see what's going on in teaching and research in energy and the environment, viewed broadly."

Doucet says the existing expertise at the U of A in energy and the environment and related subjects – such as law, business, public health and economics – is enviable. Drawing those experts together under one virtual institute will encourage interdisciplinary teaching and research and help attract academics.

"We have a lot of credibility as an academic institution and we build added credibility if we engage people from across all disciplines," he said.

Doucet explained that SEE will help "grow the intellectual environment" for both students and professors by facilitating research opportunities focused on collaboration across disciplines.

"When we have conferences and workshops they will be less likely to be single-discipline events. If Economics does something because of SEE, for example, it will be more likely that they will bring in someone from Law and Anthropology as well," Doucet said.

"I hope that six months from now if people Google the U of A and energy and the environment, they come to the SEE's website and it will point them to workshops and lectures and classes and post-doctoral opportunities and events. People should see all the opportunities that are here. It should be more than a look at a department and what is going on in

"When we have conferences and workshops they will be less likely to be single-discipline events. If Economics does something because of SEE, for example, it will be more likely that they will also bring in someone from law and anthropology as well."

– Dr. Joseph Doucet

it – people in mechanical engineering or economics, or anthropology, or native studies or sociology who are also interested in energy and the environment will find something of interest to them."

On the graduate student side, Doucet hopes by next fall to have an interdisciplinary seminar with a slate of speakers from across campus, and perhaps visiting lecturers, "so the students are exposed to a range of disciplinary backgrounds and approaches to better inform them of the vast array of approaches to problems of energy and the environment. It will be a forum for students from different disciplines to come together."

It's a modest approach, but Doucet says it is important to start with small steps.

"Eventually, I am trying to propose interdisciplinary degrees," he said.

SEE will also be the U of A's point of contact with the new Canada School of Sustainable Energy, a national research body established by the U of A with the Universities of Calgary and Lethbridge. ■



Dr. Joseph Doucet is heading up the new School for Energy and the Environment. The 'virtual' institute will draw on the expertise of professors from all disciplines.

## Prof collaborates on tsunami warning system

► Continued from Page 18

"An indication of the hazard was available on the Internet 10 minutes after the earthquake. However, communication from the outside world and within Sri Lanka failed abysmally."

– Dr. Gordon Gow

In March 2004, nine months before the Indian Ocean tragedy, Gow and a colleague at Simon Fraser University published a report with the federal government on Canada's tsunami warning system. He says of the findings from that report, "Many of the challenges for public warning in a country like Sri Lanka are oddly similar to those we have identified in rural and remote parts of Canada, such as the west coast of British Columbia ... the hardest part in both cases is the last-mile portion of the system."

The last-mile, explains Gow, is where warning messages are disseminated at the community level. It is usually the weakest link in the chain.

"In Sri Lanka we're looking at how well last-mile technology can be integrated into the community response plan and if it is being well maintained," said Gow. "The long-term goal is social sustainability of the system, in order to maintain an effective level of readiness with the goal of saving lives. If such a system had been in place when the tsunami hit, it's likely that losses would have been much reduced."

Gow, author of the book *Policymaking for Critical Infrastructure*, is also working with the federal government to establish a national all-channel warning system in Canada, known as CANALERT. No comparable system currently exists and he is part of a team investigating how it will fit within the current communications policy framework.

Of this work, Gow says, "there is a real need to better understand the complexity and challenges of an all-channel public alerting system if it is to be an effective investment in public safety."

Gow's research activities at the University of Alberta include other areas of public safety communications issues, such as enhanced 9-1-1 for cellular and Internet phones, critical infrastructure protection, and the use of wireless technology in emergency services support. He has presented his work about the Sri Lanka project at international conferences. ■



Community leaders in Sri Lanka receiving a satellite radio that will enable them to receive special bulletins issued by the project's Hazard Information Hub.



# Enterprise Square update



Steve Slupsky, CEO of Scanimetrix, examines a prototype of a revolutionary new method of testing semiconductor chips which was invented in the Faculty of Engineering. Scanimetrix is the type of startup that will grow Edmonton's knowledge-based economy from the TEC Centre. The company started with one person in the current Research Transition Facility and now has more than 20 employees, international clients and a recent \$6.5 million financing deal.

## TEC Centre to move ideas to marketplace

By Jason Darrah

High-rise office workers in downtown Edmonton have been watching the steel and glass shell of the new fourth floor take shape atop Enterprise Square, witnessing the birth of the region's future innovation dynamo: the TEC Centre.

Replacing the current Research Transition Facility on campus, the TEC Centre will provide lab and office space to grow technology ventures, most of which originate in research programs at the University of Alberta.

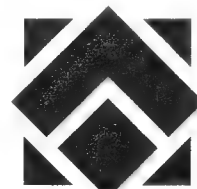
When operational in the fall of 2007, the TEC Centre will encompass the entire 60,000-sq-ft. fourth floor and part of the third floor, providing space to about 20 tenants.

TEC Edmonton, a joint venture of the U of A and the city's Edmonton Economic Development Corporation, will manage the TEC Centre and provide incubation and development services that help share inventions with the world, while generating high-skilled jobs for the local economy.

TEC Edmonton evaluates inventions for commercial potential and protects the intellectual property, usually with patents. Technologies are then marketed to existing companies or become the basis for new spin-off companies. The TEC Centre provides space to researchers pursuing commercial projects, which cannot be undertaken in publicly funded space on campus due to conflict of interest policies.

The downtown core location will improve access to partnerships and professional services in TEC Edmonton's volunteer network, which provides advice on issues such as financing, marketing, accounting and legal issues.

The TEC Centre will be a great connection between university innovation and community opportunity. ■



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## Keeping God is His Place: Religious Faith and Secular Clout

**Alan Borovoy, General Counsel**  
Canadian Civil Liberties Association

Alan Borovoy is one of Canada's foremost activists and legal experts in the area of individual freedoms and equality rights. In 2006, he won the International Press Freedom Award from the Canadian Journalists for Free Expression. He has served as General Counsel of the CCLA since 1968.

Thursday, January 11, 2007

12:00 - 2:00 p.m.

Room 231/237 Law Centre

University of Alberta

*This presentation is open to the public.*

*A light lunch will be served.*

RSVP by Jan. 9 to [aholder@law.ualberta.ca](mailto:aholder@law.ualberta.ca) or 492-5681



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# talks & events

Submit talks and events to Lorraine Neumayer by 12 p.m. Thursday one week prior to publication. **Folio Talks and Events listings do not accept submissions via fax, mail, e-mail or phone. Please enter events you'd like to appear in Folio and on ExpressNews at: <http://www.uofaweb.ualberta.ca/events/submit.cfm>.** A more comprehensive list of events is available online at [www.events.ualberta.ca](http://www.events.ualberta.ca).

## UNTIL APR 10 2007

**Graduate Student Support & Strategy Group (GS3G)** Offers grad students a comfortable and supportive environment to: discuss concerns/challenges/experiences related to being a grad student; develop effective problem-solving and coping strategies related to these areas; share and hear about other students experiences. Individuals will not be able to attend without meeting with the facilitator prior to the group. If you wish to RSVP online and choose to leave your phone number and/or e-mail address, we will contact you to schedule an appointment with the facilitator for a pre-screening appointment. If you choose to RSVP online with only your name, please contact Student Counselling Services to book an appointment. 2:30 - 4 p.m. 2-600 Students' Union Building (SUB) <http://www.uofaweb.ualberta.ca/counselling/g3g.cfm>

## UNTIL JAN 31 2007

**CAUCE 2007 Portraits of Tomorrow: Landscapes, Learners, Leaders** Aberhart Centre <http://www.cauce2007.ca>

## JAN 5 2007

**University Teaching Services - GTA Orientation** University Teaching Services (UTS) invites you to attend the Winter 2007 Orientation for Graduate Teaching Assistants (GTAs). This is an opportunity for you to meet new colleagues and learn more about teaching as well as your role and responsibilities as a GTA. The orientation is aimed at new instructors who may have extensive subject matter expertise but little teaching experience. All GTAs, new and returning, are encouraged to attend. Skilled faculty will lead workshops and seminars on effective teaching strategies. As a GTA, you play a vital role in enhancing the learning environment for undergraduate students. This orientation is planned with you in mind, to help you feel more prepared for and confident in your teaching. We hope that you will attend. Please note: The sessions are free of charge and open to all graduate students. Advance registration is required. Please register online at <http://utsregistration.ualberta.ca/>. 243 Central Academic Building <http://www.ualberta.ca/~uts>

**Pandas Hockey** Pandas vs. Manitoba. 7 p.m. Clare Drake Arena Physical Education and Recreation Centre, Van Vliet. [www.cubsclub.ualberta.ca](http://www.cubsclub.ualberta.ca)

## JAN 6 2007

**Pandas Hockey** Pandas vs. Manitoba. 7 p.m. Clare Drake Arena Physical Education and Recreation Centre, Van Vliet [www.cubsclub.ualberta.ca](http://www.cubsclub.ualberta.ca)

## JAN 10 2007

**Alberta Injury Control Teleconference** Dr. Vicky Scott, Senior Advisor, Fall Prevention, British Columbia Injury Research and Prevention Unit will present a seminar entitled Canadian Falls Prevention Curriculum Project. To register for this teleconference, please refer to the contact information shown below. Month-to-month subscriber rates for the teleconference are \$20 (\$25 for out of province). Port reservations must be made in writing (by fax) no less than 48 hours prior to the scheduled teleconference. 9 - 10 a.m. 4070-A Research Transition Facility <http://www.med.ualberta.ca/acicr>

**WestGrid Seminar Series** Submitting jobs to Westgrid: An intro to submitting, monitoring, output and troubleshooting jobs on WestGrid systems. 1:30 - 2:30 p.m. 315 General Services Building <http://www.westgrid.ca>

## JAN 11 2007

**Lunch & Learn: Cardio Works Power Hour** Are you ready to burn off some steam? Join us for this active lunch & learn where we will engage in some serious cardio conditioning, along with elements of body sculpting and core training. Enrollment is limited to 20 participants; register early to avoid disappointment and remember to release your spot if you are unable to attend. These sessions are free for all U of A staff. Register online at [www.learningshop.ualberta.ca](http://www.learningshop.ualberta.ca) 12:10 - 12:50 p.m. W1-17 Physical Education and Recreation Centre, Van Vliet <http://www.learningshop.ualberta.ca>

**Harry J. Paarsch** "Stochastic Dynamic Programming in Space: An Application to British Columbia Forestry." Harry J. Paarsch, professor of economics and Robert Jensen, research fellow Department of Economics, Henry B. Tippie, College of Business, University of Iowa. A copy of the paper will be available in January. 3:30 p.m. 8-22 Tory Building.

## JAN 12 2007

**Monthly History of Medicine Seminar Series** Dr. Pat Prestwich, History and Classics. "Diagnosing Psychological Trauma in French Soldiers of the Great War." 12 - 1 p.m. 2-59 Zeidler Ledcor Centre <http://www.uofaweb.ualberta.ca/historyandclassics/histmedsemseries.cfm>

**Pandas Basketball** Pandas vs. Winnipeg. 6 p.m. Main Gym Physical Education and Recreation Centre, Van Vliet. [www.cubsclub.ualberta.ca](http://www.cubsclub.ualberta.ca)

**Bears Basketball** Bears vs. Winnipeg. 8 p.m. Main Gym Physical Education and Recreation Centre, Van Vliet. [www.cubsclub.ualberta.ca](http://www.cubsclub.ualberta.ca)

**Music at Convocation Hall II** Music at Convocation Hall II. Jolaine Kerley, soprano. Timothy Shantz, tenor. Jeremy Spurgeon, piano/harpichord. English Songs from Dowland to Britten. 8 p.m. Arts and Convocation Hall. <http://www.ualberta.ca/music>

## JAN 13 2007

**Human Rights of Children with Disabilities: Progress or Promise Unfulfilled?** Guest Scholar: Dr. Dick Sobsey, professor, Department of Educational Psychology; director, John Dossetor Health Ethics Centre. Moderator: Dr. Martin Tweedale, professor emeritus, philosophy 2 - 3:30 p.m. <http://www.uofaweb.ualberta.ca/publicaffairs/philosopherscafe.cfm>

**Pandas Basketball** Pandas vs. Manitoba 6 p.m. Main Gym Physical Education and Recreation Centre, Van Vliet [www.cubsclub.ualberta.ca](http://www.cubsclub.ualberta.ca)

**Bears Basketball** Bears vs. Manitoba. 8 p.m. Main Gym Physical Education and Recreation Centre, Van Vliet. [www.cubsclub.ualberta.ca](http://www.cubsclub.ualberta.ca)

**Lafayette String Quartet** Artists-in-Residence at the University of Victoria since 1991, the four women of the internationally renowned Lafayette String Quartet perform works by Haydn, Shostakovich, and Mendelssohn. 8 p.m. Convocation Hall Arts and Convocation Hall. <http://www.edmontonchambermusic.org>

## JAN 15 2007

**Visiting Speaker** William Trimble, Ph.D., F.R.S.C., head, program in Cell Biology, senior Scientist, Hospital for Sick Children, research chair in molecular biology, and professor of biochemistry, University of Toronto. Title of Talk: "Functional analysis of septins in the mammalian nervous system." 9:30 - 10:30 a.m. 510 Medical Sciences Building Medical Sciences. <http://www.ualberta.ca/cellbiology>

**Education Career Fair** The Education Career Fair is an opportunity for Education students to meet with employers recruiting talented U of A students and alumni. 10 a.m. - 4 p.m. <http://www.ualberta.ca/caps>

## JAN 16 2007

**Lunch & Learn: Reason to Hope - a positive perspective on caring for elderly parents** There is, for many of us, a morning when we may wake to find the tables turned. Suddenly, we are giving care to those who used to care for us. How can we face the changes and be hopeful at the same time? How can we bridge the gap between what we are able to do and the things expected of us? Join us for a lively, practical session where will address the challenges facing the sandwich generation. These sessions are free for all U of A staff. Register online at [www.learningshop.ualberta.ca](http://www.learningshop.ualberta.ca) 12:05 - 12:55 p.m. Heritage Lounge Athabasca Hall <http://www.learningshop.ualberta.ca>

## JAN 17 2007

**Public Health Sciences Grand Rounds** Dr. Peter Rothe, associate professor, Alberta Centre for Injury Control and Research. Topic: "Impaired Driving and Designated Drivers: No Longer a Genie in the Bottle." 12 - 1 p.m. 2-117 Clinical Sciences <http://www.phs.ualberta.ca/>

**Debt-Management Seminar** If you've just graduated, or are about to, there's a 50 per cent chance you have student debt. Learn how to manage your money and repay your loans... without living off Kraft dinner for the next five years! 7 - 9 p.m. Glacier Room Lister Centre [www.uofaweb.ualberta.ca/youngalumni](http://www.uofaweb.ualberta.ca/youngalumni)

## JAN 18 2007

**Lunch by the Books: Health and War: The North American Mustard Gas Experiments of World War II (Susan Smith, History & Classics)** Lunch by the Books is a free noon-hour learning



## Louis Desrochers Lecture Series in Canadian Studies

You are cordially invited to attend a public lecture to be given in English only by

**The Honourable Peter Lougheed**

entitled "The Changing Government Scene in Alberta and Canada"

**Thursday, January 18, 2007 • 7:30 p.m.**

**Campus Saint-Jean, Auditorium of Pavillon McMahon  
(8406 - 91 Street, Edmonton)**

## Official Opening of the Canadian Studies Institute

Campus Saint-Jean is proud to announce the opening of the new Canadian Studies Institute. This Institute will promote teaching, research, publication and service/citizenship activities in the field of Canadian Studies in both official languages.

Please join

**Dr Indira Samarasekera, President of the University of Alberta**  
and

**Mr Rahim Jaffer, Representative of the Federal Government**  
and MP for Edmonton-Strathcona

for the official opening of this institute. A reception will follow.

**Thursday, January 18, 2007 • 8:45 p.m.**

**Campus Saint-Jean, Grand salon of Pavillon Lacerte  
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RSVP before January 12, 2007:

Marie-Claude Levert • (780) 485-8635 • [levert@ualberta.ca](mailto:levert@ualberta.ca)

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series. Presentations run from 12:05-12:50 p.m. During World War II, North American scientists conducted mustard gas experiments on thousands of American and Canadian soldiers as part of military preparation for potential chemical warfare. Learn what Dr. Smith has discovered in her research. All are welcome! Bring your lunch! Lunch by the books is presented by the Faculty of Arts & the Edmonton Public Library. <http://www.uofaweb.ualberta.ca/arts/LunchbytheBooks.cfm>

**University Teaching Services** Teaching and Learning Basics offers graduate students in the University Teaching (UT) Program opportunities to practice their teaching skills. The third Thursday morning of each month is set aside for graduate students and others to present to their peers on an aspect of teaching or learning. Participants are invited to give a 15-minute presentation on a teaching topic of their choice. Discussion following the presentations will focus on teaching and learning basics. 9 a.m. - 12 p.m. CAB 215 Central Academic Building <http://www.ualberta.ca/UTS/>

**Walter Johns Alumni Circle** Come back to campus for a regular sampling of the vibrant intellectual and cultural life of the University. The Johns Alumni Circle features lectures and presentations by top faculty members and an opportunity to meet and mingle with fellow alumni. Pain: friend, foe or unwelcome guest? Aches and pains are part of life, but we vary greatly in the way we respond to painful events. In this lecture, Saifee Rashid, an associate professor of anesthesiology and director of the University Hospital's Multidisciplinary Pain Centre, will explain our latest understanding of how the experience we call pain is created, and describe the scientific evidence for or against a number of commonly used pain-relief strategies. At a Busy Intersection David Goa, the director of the new Chester Ronning Centre at the University's Augustana Campus will tell us why he believes that Centre to be where the action is at the intersection of religion, faith and public life. 10 a.m. - 12 p.m. Aon Boardroom Alumni House <http://www.uofaweb.ualberta.ca/alumnieducation/nav01.cfm?nav01=14319>



## Faculty of Science University of Alberta

### Announcement Faculty of Science Research Award

We are seeking nominations for the Faculty's most promising young scientists for this annual award, which recognizes outstanding research achievement. Nominees must have obtained their doctorates in 1995 or later.

**Deadline:**  
**January 15, 2007**

For details of eligibility and conditions, please contact:

Dr. Renée Elio  
Associate Dean (Research)  
E-mail: ree@cs.ualberta.ca  
(780) 492-3169  
or  
Crystal Moore  
(780) 492-7488  
crystal.moore@ualberta.ca

### Faculty of Science Award for Excellent Teaching

We are seeking nominations from students and departments in the Faculty of Science for this annual award for individuals with outstanding qualities in undergraduate teaching.

**Deadline:**  
**January 19, 2007**

For details of eligibility and conditions, please contact:

Dr. Brenda Leskiw  
Associate Dean  
E-mail: bleskiw@ualberta.ca  
(780) 492-9452

# positions

*The records arising from this competition will be managed in accordance with provisions of the Alberta Freedom of Information and Protection of Privacy Act (FOIPPA). The University of Alberta hires on the basis of merit. We are committed to the principle of equity of employment. We welcome diversity and encourage applications from all qualified women and men, including persons with disabilities, members of visible minorities, and Aboriginal persons. With regard to teaching positions: All qualified candidates are encouraged to apply; however, Canadians and permanent residents will be given priority. For complete U of A job listings visit [www.hrs.ualberta.ca](http://www.hrs.ualberta.ca).*

### DEPT OF OCCUPATIONAL THERAPY CLINICAL TRACK TEACHING APPOINTMENT

Applications are invited for a full-time academic position at the University of Alberta, Department of Occupational Therapy.

The program is among the top occupational therapy schools in Canada and the Department of Occupational Therapy is poised for continued growth. Newly allocated funding has resulted in increased enrolment and expansion in program delivery methods. As part of the Faculty of Rehabilitation Medicine, the department offers an entry-to-practice degree in Occupational Therapy and participates fully in an interdisciplinary M.Sc. (thesis) and PhD degree programs in Rehabilitation Science. The Department currently consists of nineteen full-time faculty members.

Candidates must be an occupational therapist, eligible to register with the Alberta College of Occupational Therapists, with a minimum of a master's degree in any field. This clinical position will support entry-to-practice and graduate teaching in one or more of the following areas: mental health, return to work (vocational rehabilitation) and/or pediatrics. Indicators of teaching proficiency are therefore required and knowledge of curriculum development is an asset. The appointment is for a minimum of three years at the Assistant Professor level. Salary will be commensurate with experience. For details about the position or the Occupational Therapy Department, please contact Dr. V. Hollis: vivien.hollis@ualberta.ca; phone: 780 492 0399

Qualified applicants should send a curriculum vitae, a statement of teaching, and any related

research interests along with the names of three (3) references to:

Dr. Albert Cook, Dean  
Faculty of Rehabilitation Medicine  
3-48 Corbett Hall  
University of Alberta  
Edmonton, Alberta, Canada T6G 2G4  
Phone: 780-492-5991 Fax: 780-492-1626  
Email: al.cook@ualberta.ca

Review of applications will continue until the position is filled.

All qualified candidates are encouraged to apply; however, Canadians and permanent residents will be given priority. If suitable Canadian citizens or permanent residents cannot be found, other individuals will be considered.

The University of Alberta hires on the basis of merit. We are committed to the principle of equity of employment. We welcome diversity and encourage applications from all qualified women and men, including persons with disabilities, members of visible minorities, and Aboriginal persons.

### ACADEMIC COORDINATOR OF CLINICAL EDUCATION FACULTY OF REHABILITATION MEDICINE DEPARTMENT OF PHYSICAL THERAPY

Applications are invited for a full-time clinical track contract position in the Department of Physical Therapy at the University of Alberta. The position is available as early as April 1, 2007.

As a department in the Faculty of Rehabilitation Medicine, Physical Therapy offers an innovative course based MScPT program that

integrates strong clinical and evidence based practice skills. The department also participates fully in the interdisciplinary MSc and PhD programs in Rehabilitation Science. The department currently consists of sixteen full-time faculty members.

This Assistant Professor position is responsible for managing the day-to-day operations of the clinical education program. This includes development of placement sites, liaising with clinical supervisors and advising students as required. This position may also involve some entry level teaching in the MScPT program. Applicants must possess a minimum of a Master's degree and be eligible for licensure with the College of Physical Therapists of Alberta. Knowledge of clinical education/supervision is an asset. This is a 3-year renewable appointment. The initial appointment is at the Assistant Professor level and salary will be commensurate with experience.

For further details about the position or the department contact Dr. R.G. Haennel (chair) at Bob.Haennel@ualberta.ca or phone (780) 492-2889. Website: <http://www.uofaweb.ualberta.ca/rehabmed/PhysicalTherapy.cfm>

Qualified applicants should send a curriculum vitae, a statement of clinical education and teaching interests, and the names of three (3) referees to:

Dr. A. Cook, Dean  
Faculty of Rehabilitation Medicine  
3-48 Corbett Hall  
University of Alberta  
Edmonton, Alberta, Canada T6G 2G4  
Phone: 780-492-5991  
E-mail: albert.cook@ualberta.ca

Applications will be reviewed as they are received and will continue until the position is filled.

# notices

*Please send notices attention Folio, 6th floor General Services building, University of Alberta, T6G 2H1 or e-mail [public.affairs@ualberta.ca](mailto:public.affairs@ualberta.ca). Notices should be received by 12 p.m. Thursday one week prior to publication.*

### FSIDA (FUND FOR SUPPORT OF INTERNATIONAL DEVELOPMENT ACTIVITIES) APPLICATION DEADLINE

The deadline for receipt of applications to the FSIDA is 4:30 p.m., Jan. 15, 2007.

This Fund exists to enable staff and graduate students of the University of Alberta to participate in the international transfer of knowledge and expertise and graduate research through partnerships in developing countries.

Applications and guidelines are available on the University of Alberta International website [www.international.ualberta.ca](http://www.international.ualberta.ca) or from the FSIDA Secretary at University of Alberta International, 1204 College Plaza, 8215-112 Street, telephone 492-2391.

### ALAN BLIZZARD AWARD

The Alan Blizzard Award was developed by the Society for Teaching and Learning in Higher Education (STLHE) to stimulate and reward collaboration in teaching, and encourage and disseminate the scholarship of teaching. The award is given to collaborative projects that increase the

effectiveness of student learning. The first Alan Blizzard Award was given in 2000; teams from the University of Alberta received the award in 2000 and 2003.

The deadline to submit applications to STLHE for the Alan Blizzard Award is Jan. 12, 2007. The application form is available at <http://www.mcmaster.ca/stlhe/awards/alan.blizzard.award.html>. Inquiries may be directed to Aline Germain-Rutherford, Alan Blizzard Coordinator, STLHE, at [agermain@uottawa.ca](mailto:agermain@uottawa.ca). More information and assistance is also available from Bobbi Schiestel, Faculty Awards Facilitator, Academic Awards and Ceremonies, at 492.2644 or via email at [bobbi.schiestel@ualberta.ca](mailto:bobbi.schiestel@ualberta.ca).

### 2007-2008 KILLAM ANNUAL PROFESSORSHIPS

Applications for the 2007-2008 Killam Annual Professorships are now available. All regular, continuing, full-time academic faculty members who are not on leave during 2007-2008 are eligible to apply. Deans, department chairs and other senior university administrators with personnel responsibilities shall not normally be eligible for Killam Annual Professorships. Associate deans and associate department chairs are eligible providing they do not have personnel responsibilities. Up to eight Killam Annual Professors will be selected by a subcommittee of the Killam Trusts Committee; no more than two professorships shall be awarded to staff members in any one faculty in any given year. Each Killam Annual Professor shall be presented with a \$3,500 prize and a commemorative plaque. The duties of Killam Annual Professors shall not be changed from those that they regularly perform as academic staff members.

The primary criterion for selection shall be a record of outstanding scholarship and teaching over three or more years as evidenced by any or all of research publications, creative activities, present-

ed papers, supervision of graduate students, and courses taught. The secondary criterion shall be a record of substantial contributions to the community outside the university, above and beyond what is usually expected of a professor, as evidenced by community involvement normally directly linked to the applicant's university responsibilities and activities. However, other forms of community involvement will be considered, especially, but not exclusively, where the applicant's discipline does not readily lend itself to making community contributions, and also where the university's reputation is clearly enhanced by the applicant's contributions.

Awards are tenable for twelve months commencing July 1, 2007. The completed application must be received at the Office of the Vice-President (Research), 3-7 University Hall, by 4:30 p.m., Friday Feb. 23. The awardees shall be announced by early May, and they will be formally recognized at the Killam Luncheon in October 2007.

Applications and further details are available on the home page of the Vice-President (Research) at: <http://www.uofaweb.ualberta.ca/vpresearch/>

Please contact Annette Kujda, Administrative Officer, Office of the Vice-President (Research) at extension 28342 or email: [annette.kujda@ualberta.ca](mailto:annette.kujda@ualberta.ca) if you have any questions.

### THE EDMONTON AGING SYMPOSIUM – DEADLINE FOR SUBMISSIONS

A thought provoking two days that involves presentations which examine the economic and ethical justifications for the development of technologies capable of extending the human lifespan as well as evidence provided by top researchers in the fields of stem cells, tissue engineering, cancer therapies, neurodegeneration and others, that demonstrates these technologies are possible and under development. Poster submissions accepted until March 15, 2007, symposium held March 30-31,

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Contact Kevin Perrott, Department of Biochemistry at: 780-983-8383 (phone), 780-492-0886 (fax) or at kevin.perrott@edmontonagingsymposium.com. Web site: <http://www.edmontonagingsymposium.com>

#### AWARDS FOR TEACHING EXCELLENCE (CALL FOR NOMINATIONS)

Nominations are now being sought for the annual Rutherford Award for Excellence in Undergraduate Teaching, WH Alexander Award for Excellence in Undergraduate Teaching and the Teaching Unit Award. Complete information on the awards and the nomination process is available in the University of Alberta Policies and Procedures On-Line (UAPPOL) system, under the parent policy "Awards for Teaching Excellence."

Nominations are made by faculties that teach undergraduate students, and information about the nomination procedures and adjudication criteria has been sent to those faculties. Nominations should be made through a faculty committee and submitted by the faculty to the Secretary of GFC UTAC, 2-5 University Hall. Anyone needing assistance and advice in preparing nominations should contact Bobbi Schiestel, faculty awards facilitator, Academic Awards and Ceremonies Office (492-2644). The deadline for receipt of award nominations is Friday, Feb. 23 at 4:30 pm. In most cases, individual Faculties have established earlier deadlines to allow for internal adjudication procedures. [https://www.conman.ualberta.ca/stellent/groups/public/academic/documents/policy/pp\\_cmp\\_060320.hcsp](https://www.conman.ualberta.ca/stellent/groups/public/academic/documents/policy/pp_cmp_060320.hcsp)

#### CALL FOR PROPOSALS - THE SOCIETY FOR TEACHING AND LEARNING IN HIGHER EDUCATION ANNUAL CONFERENCE

The Society for Teaching and Learning in Higher Education (STLHE) invites you to submit proposals for workshops, presentations, and posters for its 27th Annual Conference next summer. The 2007 Conference will be held June 13 -16 at the University of Alberta. The theme chosen for this exciting event is Evolving Scholarship which captures the current national focus and discussion around the scholarship of teaching and learning. For more information and to make your submission please visit the Conference website: <http://www.ualberta.ca/~uts/STLHE/> The deadline for submissions is Jan. 26, 2007.

#### INTERNATIONAL PARTNERSHIP FUND

The "International Partnership Fund" (IPF) was established to support University of Alberta faculty and staff participating in exchange activities with the university's many partner institutions around the world. The fund provides financial support to faculty and staff engaged in the development and/or implementation of activities that contribute to sustainable and reciprocal relations with international academic partners. Awards may be used for travel by either the U of A staff/faculty member to visit an international partner, or for the faculty or unit to support a visitor from the partner. The fund favors activities that develop projects bringing an international focus to the academic, research and teaching mandate, and contribute to the internationalization objectives of the faculty.

Support from the IPF will ideally complement multiple funding sources. Matching support from the individual and/or the department/faculty and partner institution is required.

Note: The IPF only applies to those institutions with which the U of A has a formal agreement.

For guidelines, application forms and list of eligible partner institutions, please visit the University of Alberta International website: <http://www.international.ualberta.ca/intlpartners.php>

For more information please call 492-5840 or e-mail: [ipf@international.ualberta.ca](mailto:ipf@international.ualberta.ca)

Application deadline: Thursday, Feb. 1.

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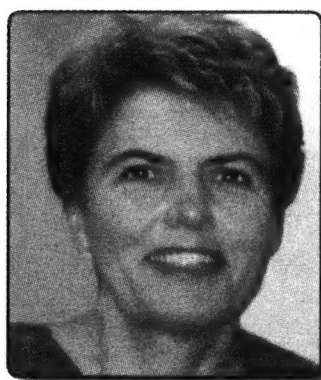
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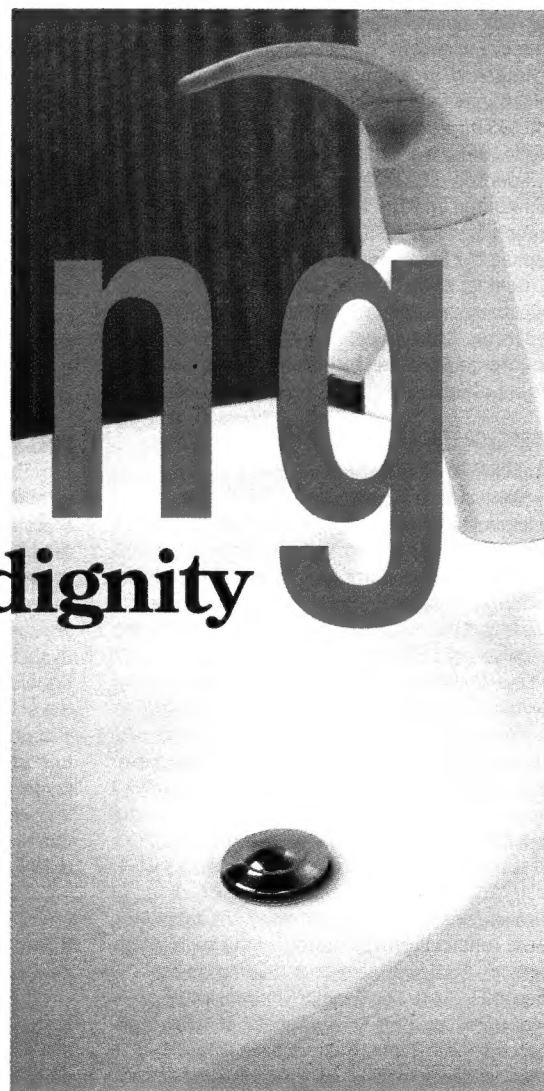
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# designing

## aids for dignity

This concept sink is height-adjustable, and features a nearly "edgeless" design to limit injuries in the case of a slip or fall, and increase the ease of cleaning.



### Industrial Design, Occupational Therapy students team up to help those with mobility challenges reclaim personal spaces

By Mark Wells

Consider your washroom. Can you get out of the shower easily? Now imagine yourself in a wheelchair. How do you reach the sink? Do you have enough room to open the cupboards? Can you reach the medicine cabinet?

Now ball your hands into fists – you've just simulated the symptoms of severe rheumatoid arthritis. How do you brush your teeth? Can you turn on the taps in your washroom sink?

University of Alberta Industrial Design students considered such questions and issues of basic personal dignity while working out designs for height-adjustable counter/sink combinations, no-hands flossing tools, sliding medicine cabinets, faucetless sinks and load-relieving stools for the 4th Annual Symposium on Universal Design and Aging.

Students weren't left alone to ponder such problems: each team of three designers worked with occupational therapists who provided the physiological expertise needed to build a truly ergonomic and accessible washroom.

This year's symposium has drawn the interest of Alberta Seniors and Community Supports. Supportive Living Director Bruce West says the government department is searching for new ways to accommodate seniors whose health problems make it difficult for them to live independently at home, but don't warrant the expense of a long-term care facility.

Robert Lederer and Lili Liu, professors in the U of A Departments of industrial design and occupational therapy, launched the symposium four years ago. The symposium is a winner for students from both departments they say, as it instills the confidence and knowledge required for careers in health sector industrial design.

"Lili and I have been able to synthesize these two disciplines, using universal design as a vehicle...to create these great ideas," he said.

"From where I'm from, I get calls all the time asking 'Can you refer me to someone who can help us with a design?' or I get grads saying they have these (design consulting) opportunities, but 'Am I trained to do this?'" said Liu.

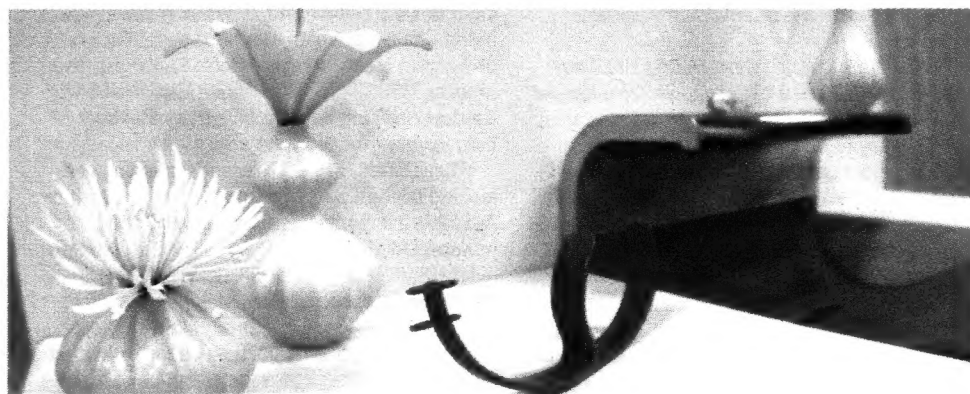
Lederer explains that the symposium is helping train grads for these kinds of opportunities.

"You've got companies with designers and they're trying to bring in all these other professionals, [wondering] how do you get them to talk and work together? We're doing it here," he said.

And the symposium is more than just a training opportunity. Winners from this year's crop of Industrial Design and Occupational Therapy students could see their product actually going to market, thanks to the sponsorship of Westlink Innovation Network Ltd., a Calgary-based technology commercialization company. ■



Christine Côté demonstrates her team's no-hands flossing tool, designed for use by amputees, those suffering arthritis, or other illnesses limiting hand strength or dexterity.



This odd-shaped tool is designed to allow those with arthritis to floss their teeth properly. In the background, a sink that can be used without turning a tap.



Christine Kwok, Andrew Czarnietzki and Scott McNiven pose with the fold-away "STOD" stool, built to allow anyone suffering moderate joint pain or fatigue from extended periods of standing. Their design earned a top-three placing at the 4th Annual Design Symposium, and a shot at commercialization.

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